BULLETIN

OF

The New York State College of Forestry

AT

SYRACUSE UNIVERSITY

SAMUEL N. SPRING, Dean

Technical Publication No. 60

THE POLYPORACEAE OF NEW YORK STATE
(Except Poria)

BY

JOSIAH L. LOWE

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Corrections to Tech. Pub. No. 60

p. 26, line 34. For "eccentric" read "excentric".
p. 78, line 39. For "P. lowei" read "Lentoporus lowei".
p. 90, line 34. Add the word "also" after "1911," and the word "and" after "1916,".
p. 105, line 39. For "5.25 X5.30" read "5-25 X5-30".
p. 115, line 45. For "1.3" read "1-3".

A few evident but not misleading typographical errors in spelling and punctuation are not indicated above.

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THE POLYPORACEAE OF NEW YORK STATE

(except Poria)

by

JOSIAH L. LOWE

The Polyporaceae include for the most part species of fungi saprophytic or parasitic upon wood. Consequently the polypores are among the chief causal agents in the decay of the wood of living and dead trees and of manufactured stock.

The following manual is a conservative treatment of the species of polypores known to occur within the state or to have been found near the borders of the state. The basis for these records was originally an examination of the specimens of polypores deposited in the herbaria of the following institutions: New York State Museum, Albany, N. Y.; New York Botanical Garden, New York, N. Y.; Cornell University, Ithaca, N. Y.; New York State College of Forestry, Syracuse, N. Y.; Buffalo Museum of Natural Science, Buffalo, N. Y.; and the Herbarium of the University of Michigan, Ann Arbor, Mich. Mycological and pathological literature were also examined.

The notes following the descriptions of each species are based upon the records accompanying the specimens in the herbaria, supplemented by the literature records and the writer's field experience. The pathological literature cited after most of the species is not intended to be exhaustive, but rather to represent selected articles which, in addition to a treatment of the subject, give a good bibliography. The list of illustrations likewise represents a selection on the part of the writer.

ACKNOWLEDGMENTS

In the preparation of this revised edition, grateful thanks are due Dr. L. O. Overholts, Pennsylvania State College, State College, Pa., who has given much assistance and advice, and to many other mycologists who have communicated suggestions for the improvement of the manual. Acknowledgements are made to the following directors of herbaria for the privilege of restudying specimens: to Dr. H. D. House, New York State Museum, and to Dr. H. M. Fitzpatrick, Cornell University.

METHODS

Macroscopic examinations were made with the aid of a small hand lens (14x). Microscopic data were obtained from free hand sections cut with a sectioning razor and mounted in three percent

potassium hydroxide (KOH) solution, which causes the spores and other structures to swell to approximately normal size. Dried specimens were sometimes quickly softened by applying alcohol followed by water; in most cases however, the sections were made from unsoftened material. Hyphal characters were obtained by teasing thin sections of the context with needles, and hymenial characters from either longitudinal or cross sections of the tubes.

MORPHOLOGY AND CLASSIFICATION

The arrangement follows the classical Friesian system except for the segregation of the genus Ganoderma. Classification along more natural lines is highly desirable, but so far no generally accepted system has been evolved. The family was divided into a great many genera in the monumental work of Murrill (**8**), and, chiefly for that reason, his remarkable contribution did not receive its due credit. The need, however, for genera of more limited and uniform character than the Friesian groups is strong, and has been met in part by a revision of the classification of the polypores by Adeline Ames (*Ann. Mycologici* 11:211-253. 1913), Bourdot and Galzin (**1**), Cooke (*Lloydia* 3:81-104. 1940), Donk (*Med. Bot. Mus. Herb. Utrecht*, no. 9. 1933), and the recent work of Pilát, Lohwag, and others in Europe. Pertinent evidence is accumulating from studies in the cytology, genetics, and morphology of species of Polyporaceae, and a generally acceptable revision of the classification should eventually result. The genuine practical usefulness of the Friesian system is sufficient excuse for employing it in this manual.

Genera are distinguished by the character of the pore surface, the annual or perennial nature, the resupinate or effused, sessile or stipitate habit of the fruiting body, the spore character, or by the internal structure of the fruiting body.

The presence or absence of a stem, the color of the context, the nature of the surface of the pileus, the pore size, and the size and shape of the spores are the most important characters used to separate species.

In the genus Polyporus the consistency of the fruiting body in the fresh condition is an important diagnostic character. There is no hard and fast rule by which this may be determined from a dried specimen. In general, however, extremely fleshy species dry very hard and brittle, spongy species dry more or less punky or corky, and coriaceous species dry unchanged in consistency, or become slightly more rigid.

In a small section of the genus Polyporus the color or consistency of the context differs markedly from that of the tubes. Sometimes certain species in other sections of the genus apparently show this character upon drying. In longitudinal section, however, the color of the tubes changes gradually at the juncture of the tubes and the context, while in the species truly belonging to this group the color changes abruptly.

Cystidia are restricted to species with white or brightly colored context, with the exception of *Polyporus schweinitzii*, which has a brown context. Setae are restricted to species with brown context.

The spores of the species with white or brightly colored context are hyaline. The spores of the species with brown context may be either hyaline or colored. When hyaline, the spores are often difficult to demonstrate; when brown they are usually very abundant.

The illustrations figure the more common morphological terms and structures used to characterize and separate the species of polypores.

Many species of polypores appear to be restricted to certain kinds of substrata and this specialization is most marked between coniferous and deciduous substrata. This fact is often of considerable aid in eliminating species closely related to the one in hand. The most common species are less specialized and may occur upon a substratum of either deciduous or coniferous wood, though always much more abundantly upon the one or the other.

The artificial key is based upon the more prominent characters of the species, little or no regard being paid to their natural relationships. The text key is, on the other hand, a natural key and is based upon characters least altered by accidental conditions of growth. Two distinct keys to the species are thus available. The text key should be of particular value for specimens abnormal in form, size, or other characters.

The synonomy is limited to species reported for New York State and further to those species the synonomy of which the writer has determined by an examination of types or other authentic specimens. Probable synonyms, omitted species, and misdeterminations are discussed under OBSERVATIONS which follow the specific descriptions under each genus.

If the species does not appear to be described in this work the manuals listed under "Literature Cited" should be consulted.

ILLUSTRATION I

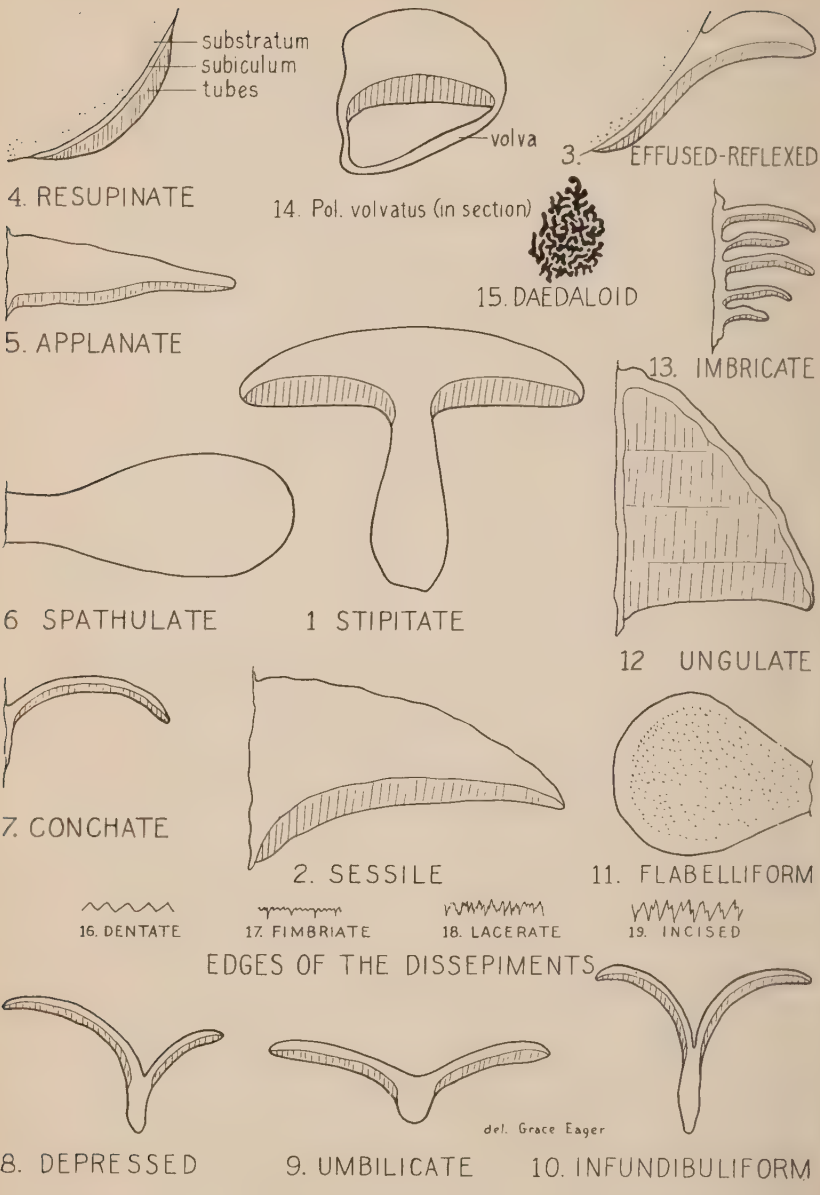

ILLUSTRATION I

Macroscopic Characters

1-14. Habit of various types of fruiting bodies in section, with the exception of No. 6, a view from the upper side, and No. 11, a view from the lower side, the margin sterile below.

12. Stratification of the tubes, typical of the perennial species in the genus Fomes.

15. Daedaloid pore surface.

16-19. Self explanatory.

ILLUSTRATION II

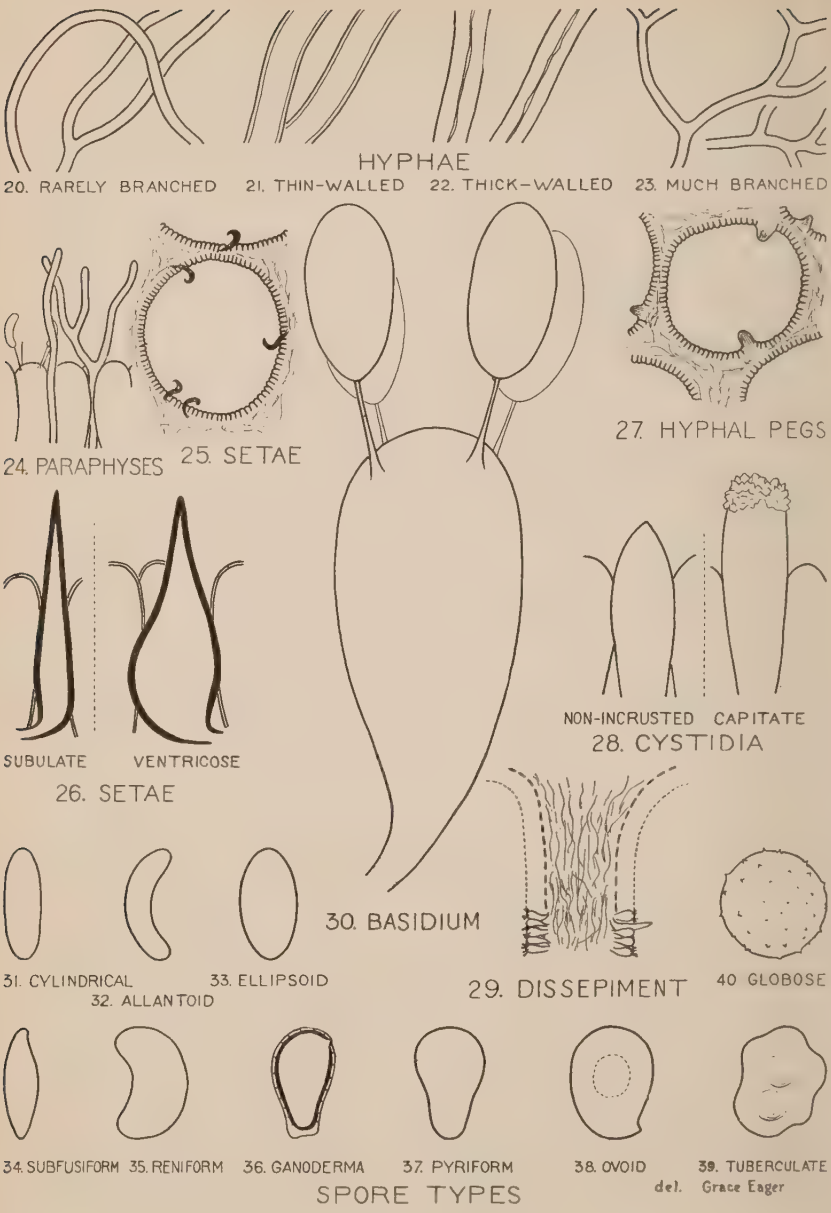

ILLUSTRATION II

Microscopic Characters

Self explanatory with the exception of:

24. Branched and simple paraphyses.

25. Setae of *Polyporus dualis.*

29. Cross section of a dissepiment near the upper end of the tubes. The hymenium lines the walls of the tubes; inside the hymenium is the tramal tissue which grades into the context above.

31-40. Surface view (except No. 36) of spores of various types as they appear under the microscope.

36. Type of spore characteristic of the genus Ganoderma. The spines project from the inner wall into or slightly through the outer wall. The apex of the spore is truncate.

38. Spore with a single guttule and with an apiculus.

39. Spore of *Polyporus griseus.*

40. Spore wall echinulate.

Descriptions and Keys

POLYPORACEAE

Fruiting body annual or perennial, stipitate, sessile, effused-reflexed, or resupinate, fleshy, coriaceous, corky, or woody; context white, bright colored, or brown; hymenium typically lining tubes throughout their length but not continuous over the edges of the dissepiments, more rarely the hymenium covering lamellae or teethlike projections; tubes coherent, when fresh usually not readily separating from the context; hymenophore (except in *P. volvatus*) exposed from the first, not covered with a volva; basidia non-septate; basidiospores hyaline or colored.

The family as defined above is in its more limited sense. The Polyporaceae connect with the Boletaceae through certain fleshy species of Polyporus, with the Agaricaceae through species of Lenzites, and with the Hydnaceae through certain species such as *Polyporus tulipiferus*.

KEY TO THE GENERA

1. Fruiting body entirely resupinate ..... *Poria*[1]
   Fruiting body effused-reflexed, sessile, or stipitate, rarely resupinate .. 2
2. Spores truncate at one end, and appearing echinulate; pileus with a crust ..... *Ganoderma* (p. 114)
   Spores rarely truncate, and if so, then not echinulate 3
3. Fruiting body perennial, the tubes arranged in layers or strata ..... *Fomes* (p. 100)
   Fruiting body annual or sometimes persisting for two or three years, but not typically perennial 4
4. Pore surface composed of concentric lamellae; pileus stipitate; spores brown ..... *Cyclomyces* (p. 99)
   Pore surface composed of radiating lamellae or gills .. *Lenzites* (p. 97)
   Pore surface poroid, the pores circular, angular, or irregularly elongated, but not lamellate 5
5. Tramal tissue not distinct from the context, the tubes often sunken to uneven distances into the context 6
   Tramal tissue distinct from the context, the tubes usually sunken to even distances into the context 8
6. Pores typically daedaloid ..... *Daedalea* (p. 93)
   Pores usually radially elongated and often breaking up to form lamellae ..... *Lenzites* (p. 97)
   Pores typically circular to angular, sometimes in age becoming more or less daedaloid 7
7. Tubes often sunken to uneven depths into the context. *Trametes* (p. 83)
   Tubes usually sunken to even depths into the context. *Polyporus* (p. 15)
8. Pores circular to angular, sometimes becoming somewhat sinuous with age, rarely radially elongated; pileus stipitate, sessile, or effused-reflexed ..... *Polyporus* (p. 15)
   Pores usually radially elongated, angular; pileus typically laterally stipitate ..... *Favolus* (p. 82)

---

[1] Not treated in this manual. For a key to the white and bright-colored porias see Baxter in Papers Michigan Acad. Sci., Arts, Lett. 15:195-211. 1932; for a key to the brown porias see Baxter in the same, vol. 17:424-431. 1933, and Overholts in Mycologia 23:125-126. 1931. See also Overholts' studies on American porias in N.Y.S. Mus. Bull. 205-206:67-166. 1919, in Mycologia 14:1-11. 1922 and 15:207-232. 1923, in Bull. Torrey Bot. Club 50:245-253. 1923 and in (**15**), and Baxter in Papers Michigan Acad. Sci., Arts, Lett. 19 and each subsequent volume.

In his most recent paper Overholts (**14**, p. 8) includes the genera Merulius and Solenia in the Polyporaceae. For a key to the species in these genera see Burt in Ann. Missouri Bot. Gard. 4:305-362. 1917 (Merulius), vol. 6:143-145. 1919 (supplement to Merulius), and vol. 11:13-26. 1924 (Solenia).

POLYPORUS (Mich.) Fries

Fruiting body annual, rarely persisting for two or three years, terrestrial or on wood, sessile, effused-reflexed, sometimes resupinate, or stipitate and upright, rarely pendant, fleshy, coriaceous, or corky to woody; context white, yellow, reddish, or brown; trama usually sharply distinct from the context, or sometimes more or less continuous with it; pore mouths typically circular to angular, occasionally sinuous to daedaloid, rarely somewhat lamellate, the dissepiments sometimes splitting to form teeth; cystidia or setae present or absent; spores hyaline or colored.

A strict definition cannot be given of a genus so large and variable as Polyporus. Difficulty may be experienced in distinguishing between Polyporus and Trametes, and there is no real distinction. In practice the differentiation is often based upon the consistency of the context, a character difficult to describe. The hymenial configuration approaches that of Daedalea in some species, of Lenzites in others. Favolus usually can be distinguished by the lateral attachment of the stem, and by the more or less hexagonal and somewhat radially elongated pores.

Numerous attempts have been made to break up the genus Polyporus into smaller, more workable genera, but no generally satisfactory divisions as yet have been devised.

KEY TO THE SPECIES

1. Fruiting body stipitate or substipitate.....2 (SECTION I)
   Fruiting body sessile or effused-reflexed, rarely resupinate..... 45 (SECTION II)

SECTION I: FRUITING BODY STIPITATE OR SUBSTIPITATE

2. Context white, whitish, yellowish, or pinkish.....3 (Subsection 1)
   Context light brown to yellowish brown or darker....37 (Subsection 2)

Subsection 1: Context white or light colored

3. Stem not black at the base nor black throughout, white to brown and more or less concolorous throughout..... 4
   Stem black at the base, or black throughout..... 6
4. Stem normally unbranched, sometimes branching once or twice but not repeatedly branched..... 5
   Stem short and thick, branching and giving rise to a few large or many small fleshy pilei..... 34
5. Stem lateral, or fruiting body pendant..... 13
   Stem central or excentric, or irregular, rarely truly lateral; fruiting body upright 25

I. Stem black at the base

6. Surface of the pileus with large appressed scales; pores large, 1-2.5 mm. broad; stem usually lateral; spores 12-16 × 4.5-6 μ, *7. P. squamosus*
   Surface entirely without scales, or with very small scales; pores usually smaller 7
7. Surface of the pileus pure white when fresh, remaining white or discoloring somewhat in age.....*1. P. admirabilis*
   Surface more or less yellowish or orange, or varying to almost black, never pure white..... 8

8. Pores 2-3 per mm.; spores 6-8 μ wide; pileus fleshy-tough when fresh, fragile when dry, the surface fibrillose-scaly to squamulose or minutely scabrous ..... *6. P. radicatus*
Pores 1-2 per mm., or larger; spores 4-5.5 μ wide; pileus fleshy-tough when fresh, fragile when dry, the surface smooth or with minute tufts of innate fibrils 9
Pores 3-4 per mm. or smaller; spores 2-4 μ wide; pileus leathery or fleshy-tough when fresh, drying rather rigid and brittle, the surface smooth or nearly so 10
9. Surface of the pileus entirely without scales; pores about 1 mm. wide ..... *7a. P. squamosus* var. *glaber*
Surface usually with tufts of small innate fibrils; pores 1-2 per mm. ..... *7b. P. squamosus* var. *fagicola*
10. Surface of the pileus varying from pale ochraceous to light reddish brown 11
Surface brown to almost black, at least in the center, and in mature specimens 12
11. Surface with distinct radial markings in the form of radial striations or fine fibrils ..... *2. P. varius*
Surface without any radial markings, or with very faint markings ..... *3. P. elegans*
12. Pores 3-4 per mm.; growing on the ground attached to buried wood ..... *5. P. melanopus*
Pores 6-8 per mm.; growing on logs and stumps ..... *4. P. picipes*

II. Stem not black at the base

A. Stem unbranched, lateral

13. Fruiting body small, not exceeding 1 cm. in any dimension; often pendant 14
Fruiting body usually much larger; very rarely pendant 15
14. Surface of the pileus brownish or whitened-pruinose; edges of the dissepiments much thickened; on deciduous wood ..... *13. P. pocula*
Surface white or whitish; edges of the dissepiments thin; on coniferous wood ..... *14. P. subpendulus*
15. Margin of the pileus thick, projecting beyond the pore surface as a wide sterile band; pileus with a thin but distinct pellicle; on birch trees ..... *10. P. betulinus*
Margin projecting little if at all beyond the pore surface; on various substrata 16
16. Context usually 3 mm. or more thick; pilei usually rather large 17
Context usually not over 2 mm. thick; pilei usually rather small 19
17. Context duplex; surface of the pileus villose-tomentose to almost glabrous; cystidia usually present; about stumps or trunks of deciduous trees ..... *9. P. biennis* var. *distortus*
Context usually duplex; surface coarsely hispid to tomentose or fibrillose; cystidia present; on coniferous wood ..... *78. P. borealis*
Context homogeneous; on coniferous wood; cystidia absent 18
18. Surface of the pileus minutely hispid; pores averaging about 2 per mm.; context drying rather hard; spores subfusiform, 12-16 $\times$ 4-6 μ ..... *12. P. hirtus*
Surface minutely tomentose to nearly glabrous; pores 4-6 per mm.; context drying bone hard; spores cylindrical, 4-7 $\times$ 2-2.5 μ, *11. P. osseus*
19. Context duplex; pores 4-5 per mm. ..... *8. P. humilis*
Context homogeneous 20
20. Pores 2-3 per mm. or larger, usually radially elongated 21
Pores 3-5 per mm. or smaller 22
21. Pores 0.5 mm. or more wide; tubes not waxy when fresh; hyphae 2.5-4 μ in diameter; spores 8-11 $\times$ 3-4 μ. . . . See *95. Favolus alveolaris*
Pores 2-3 per mm.; tubes more or less waxy when fresh; hyphae 5-8 μ in diameter; spores 3.5-5 $\times$ 2-2.5 μ ..... *57. P. rhipidium*

22. Spores 6-7.5 × 1.5-2 μ; pileus usually bearing a small cup-shaped sterile structure at the base on the upper side; surface white to yellowish; usually on elm branches.....*67. P. conchifer*
Spores 2.5-5 × 2-3 μ; a sterile cup-shaped structure never present; on wood of deciduous or coniferous trees..... 23
23. Cystidia present; on coniferous wood.....*72. P. balsameus*
Cystidia none; on coniferous or deciduous wood..... 24
24. Surface of the pileus more or less yellowish and cartilaginous when dry; on deciduous wood.....*70. P. semisupinus*
Surface white, grayish, or brownish, not becoming cartilaginous-appearing; usually on coniferous wood.....*71. P. floriformis*

B. Stem unbranched, central or excentric

1. Pileus fleshy-tough to leathery

25. Spores 11-15 × 4-5.5 μ; pileus drying fragile..... 26
Spores 6-9.5 × 2-3 μ, or smaller; pileus drying rigid and brittle.... 27
26. Surface of the pileus entirely without scales; pores usually about 1 mm. wide .....*7a. P. squamosus* var. *glaber*
Surface with tufts of small innate fibrils; pores 1-2 per mm., *7b. P. squamosus* var. *fagicola*
27. Context not over 2 mm. thick..... 28
Context 2 mm. or more thick, usually much more..... 30
28. Surface more or less yellow, varying to brownish when dry, nearly glabrous; spores ovoid to subglobose, 3-3.5 × 2.5 μ...*15. P. peckianus*
Surface light brown to yellowish brown or darker, hispid to glabrous; spores cylindrical to cylindric-ellipsoid, 6-9 × 1.5-3 μ... 29
29. Pores 1-2 per mm.; surface squamulose, hispid-tomentose to glabrous; fruiting in the spring.....*16. P. arcularius*
Pores 2-3 per mm.; surface minutely hispid to glabrous; fruiting in the summer and fall.....*17. P. brumalis*
30. Fruiting body fleshy-tough to leathery when fresh; usually epixylous 31
Fruiting body fleshy when fresh, terrestrial..... 32
31. Context duplex; spores ellipsoid to ovoid, 5-7 × 3.5-5 μ *9. P. biennis* var. *distortus*
Context homogeneous; spores cylindrical to cylindric-ellipsoid; pileus large, 10-15 cm. broad, 1-3 cm. thick.....*1. P. admirabilis*

2. Pileus fleshy

32. Spores coarsely tubercular; context rosy gray when fresh; surface of the pileus grayish to bluish-gray or darker.....*18. P. griseus*
Spores smooth; surface of the pileus bright violaceous, blue, or smoky indigo when fresh, drying bluish black or grayish blue, *19. P. caeruleoporus*
Spores smooth; surface more or less yellowish green or yellowish brown; context usually yellow when dry.....*22. P. cristatus*
Spores smooth; surface white to brownish when fresh, often becoming dark colored or reddish on drying..... 33
33. Pilei solitary; surface of the pileus usually darkening or becoming black spotted when dry; context pinkish or blackish when dry, often with a black line adjacent to the tubes.....*20. P. ovinus*
Pilei caespitose, rarely solitary; surface usually turning more or less reddish on drying; context usually drying pinkish, often with a reddish layer adjacent to the tubes.....*21. P. confluens*

C. Stem few to many times branched

34. Pilei many, 1-4 cm. broad, centrally attached.....*23. P. umbellatus*
Pilei many, 2-7 cm. broad, laterally attached.....*24. P. frondosus*
Pilei few, usually 5 cm. or more broad, centrally to laterally attached 35

35. Tubes bright sulphur yellow, rarely white; pores 3-4 per mm.; spores smooth ..... *27. P. sulphureus*
Tubes white; pores 0.5-2 mm. broad; spores echinulate..*26. P. berkeleyi*
Tubes white; pores 2-3 per mm. or smaller; spores smooth..... 36
36. Pores 5-7 per mm. ..... *25. P. giganteus*
Pores 2-3 per mm.; context whitish to yellow when dry; surface of the pileus yellowish green or yellowish brown.....*22. P. cristatus*
Pores 2-3 per mm.; context pinkish or reddish when dry; surface usually more or less reddish on drying.....*21. P. confluens*

Subsection 2: Context light brown or darker

37. Surface of the pileus with a thin crust; spores appearing echinulate 38
Surface without a crust; spores smooth..... 39
38. Crust varnished, bright red to almost black..See *137. Ganoderma lucidum*
Crust varnished, yellowish brown or more or less olivaceous, See *138. Ganoderma curtisii*
Crust not varnished; pilei sessile or more often appearing substipitate; context dark brown, soft and punky.See *140. Ganoderma lobatum*
39. Fruiting body pendant, small, up to 2.5 cm. broad; spores reddish brown ..... *28. P. dependens*
Fruiting body erect, usually much larger; spores hyaline or brown.. 40
40. Context very thin, 1 mm. or less thick..... 41
Context thicker, 1-5 mm. or more thick..... 42
41. Pores large, 1 mm. or more broad, rarely smaller; pileus dull above; hyphae often branched, 4-8 μ in diameter.....*31. P. focicola*
Pores smaller, 2-4 per mm.; pileus usually shiny silky-fibrillose; hyphae rarely branched, 6-12 μ in diameter; spores apiculate, without a guttule.....*30. P. cinnamomeus*
Pores 2-4 per mm.; pileus dull to subshiny; hyphae rarely branched, 4-6 μ in diameter; spores not apiculate but with a large guttule, *29. P. perennis*
42. Setae present; context duplex..... 43
Setae absent; context homogeneous..... 44
43. Pileus usually centrally or excentrically stipitate; setae usually straight; spores 4.5-5.5 $\times$ 3-4 μ.....*34. P. circinatus*
Pileus laterally stipitate with a short stem, or sessile; setae strongly curved; spores 6-7 $\times$ 4-5.5 μ.....*35. P. dualis*
44. Pileus large, convex to umbonate or infundibuliform; spores hyaline; cystidia brown .....*33. P. schweinitzii*
Pileus middle-sized, convex; spores brown; cystidia or setae absent, *32. P. montagnei*

SECTION II: PILEUS SESSILE OR EFFUSED-REFLEXED

45. Context white though sometimes becoming pallid or slightly brownish on drying 46
Context light brown to dark brown..... 49
Context bright colored, orange, reddish, pinkish, or yellowish..... 66
46. Margin of the pileus continuous with a volva which surrounds the pore surface .....*51. P. volvatus*
Volva never present..... 47
47. Tubes more or less smoke colored to almost black..... 71
Tubes more or less waxy when fresh, flesh colored to orange or brick red, or purplish black; or not waxy and yellowish or purplish.... 72
Tubes more or less concolorous with and of the same consistency as the context, at least where adjacent to the context..... 48
48. Pileus more or less coriaceous when fresh; context usually less than 5 mm. thick and often much thinner..... 74
Pileus soft and watery, or firm, or fleshy-tough, when fresh; context thin or thick 90

Subsection 1: Context light brown or darker

49. Fruiting body large, cylindrical, or ungulate to globose, with a central granular core 50
Fruiting body conchate to applanate or convex, or sometimes more or less resupinate; context homogeneous throughout..... 51
50. Fruiting body with a densely imbricate mass of small, closely overlapping pilei; spores hyaline.....*45. P. graveolens*
Fruiting body imbricate with few large pilei, or pilei solitary; spores brown .....*39. P. rheades*
51. Trama and context with large imbedded setae-like bodies; spores greenish yellow in mass, yellowish under the microscope, *37. P. glomeratus*
Such setae-like bodies never present; true setae present though sometimes rare 52
Such setae-like bodies never present; setae absent (in *P. schweinitzii* brown cystidia present) 57

I. Setae present

52. Spores hyaline or nearly so, frequently difficult to find..... 53
Spores brown, always abundant..... 56
53. Context duplex; spores ellipsoid to ovoid, 6-7 × 4-5.5 μ....*35. P. dualis*
Context homogeneous; spores ovoid to globose, or cylindrical to ellipsoid 54
54. Spores subglobose to globose, 4-5 μ; context 1-5 mm. thick; on coniferous wood .....See *131. Fomes pini*
Spores ovoid to subglobose, 7-8 × 5.5-7 μ; context 1.5-4 cm. thick; on deciduous wood, usually oak.....*40. P. dryadeus*
Spores cylindrical to ellipsoid..... 55
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56. Spores 5.5-7.5 × 4-5.5 μ; hyphae 6-10 μ in diameter; on deciduous wood .....*38. P. cuticularis*
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II. Setae absent

57. Surface of the pileus covered with a thin reddish or darker varnished crust; spores appearing echinulate..See *139. Ganoderma sessile*
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60. Growing only on the wood of coniferous trees, or about coniferous stumps 61
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61. Surface of the pileus strigose-tomentose to nearly glabrous; cystidia present, brown; spores ellipsoid to ovoid, 6-8 × 4-5 μ, *33. P. schweinitzii*
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Surface minutely hispid or velvety to glabrous..... 64

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Subsection 2: Context bright colored

66. Context pale buff when fresh, drying sordid flesh-color to dark red, hard, zonate; tubes often becoming blackish and agglutinate on drying .....*50. P. croceus*
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Dark line never present; tubes white; on coniferous wood .. *90. P. anceps*

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1. Spores allantoid

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99. Cystidia present; context 1-3 mm. thick; pileus surface whitish to pale brownish, subglabrous, faintly zonate; on coniferous wood, *72. P. balsameus*
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101. Surface white to grayish or brownish, not appearing cartilaginous when dry; pores 4-6 per mm.....*71. P. floriformis*
Surface whitish to yellowish, appearing cartilaginous or resinous when dry; pores 4-8 per mm.....*70. P. semisupinus*

102. Pores 1-3 per mm. or larger..... 103
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103. Pores 1 mm. or more wide; pileus surface hirsute-tomentose to rarely glabrous; on deciduous wood.....*80. P. obtusus*
Pores 1-3 per mm.; pileus surface coarsely hispid to tomentose or fibrillose; cystidia present; on coniferous wood.....*78. P. borealis*
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104. Context drying very hard and conspicuously zonate; tubes often collapsing into a rigid mass on drying.....*81. P. fissilis*
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105. Context firm and watery when fresh, soft and punky to corky when dry; spores 6-9 × 5.5-7 μ; on locust trees.....*77. P. robiniophilus*
Context soft and watery when fresh, drying firm to hard, at least below; spores smaller..... 106

106. Tubes 3-6 mm. long, when fresh often turning greenish on bruising or on drying; spores 2.5-4 × 2-3 μ.....*73. P. fumidiceps*
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107. Spores 5-7 × 4-5 μ; context usually duplex when dry; pileus surface matted-tomentose to nearly glabrous when dry....*75. P. spumeus*
Spores 3-4.5 × 2-3 μ; context drying hard and strongly zonate; surface of pileus matted tomentose to scrupose or strigose when dry; with a fragrant odor when fresh.....*74. P. galactinus*
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3. Spores cylindrical to narrowly ellipsoid

108. Pores 1-3 per mm.; fragrant when fresh; on willow and poplar, See *101. Trametes suaveolens*
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109. Context not over 1 mm. thick.....*93. P. lowei*
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112. Pileus when dry usually marked by rounded depressed spots, usually thin and applanate.....*92. P. guttulatus*
Pileus when dry fibrous-hispid or tubercular or chalky, without spots, rather thick and chunky.....*94. P. immitis*

Section I. Fruiting body typically stipitate or substipitate.
Subsection 1. Context white or whitish, at least when fresh.
Series 1. Stem usually black at the base, or black throughout.
I. Pores 3–8 per mm.; spores 2–4 μ wide.
A. Surface of pileus white or whitish.

1. Polyporus admirabilis Peck

P. underwoodii Murr.

Stem central or excentric to nearly lateral, rarely lacking, white above, more or less blackened at the base, or sometimes white throughout, glabrous, short and thick, 1-4 cm. long, 0.6-3 cm. thick; pilei caespitose or solitary, more or less imbricate and united near the base, the compound fruiting body reaching 30 cm. or more in diameter, individual **pilei** leathery when fresh, rigid when dry, centrally depressed, rarely nearly plane, 2.5-15 cm. broad, 0.5-3 cm. thick; surface pure white, usually smooth and glabrous, sometimes cracking, more or less discolored in age, azonate to somewhat zonate; margin rather thick, abruptly acute, often undulate, narrowly sterile below; **context** white to yellowish, fleshy-tough when fresh, corky when dry, 0.4-2.5 cm. thick, the hyphae rarely branched, thin- to thick-walled, 2.5-8 μ in diameter; **tubes** white to yellowish, darkening with extreme age, 1-7 mm. long, mouths white or sometimes slightly darkening on drying, when fresh "becomes blackish where handled" (Overholts), nearly circular, averaging 3-4 per mm., the edges thin, dentate to lacerate; cystidia not observed; basidia 5-6.5 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 6-9 $\times$ 2.5-3.5 μ.

On living deciduous trees. Rather rare. Summer and fall. A striking species easily recognized by its shape and pure white color. The occasional darkening of the base of the stipe and all the morphological characters indicate a close relationship to the 4 species that follow (nos. 2–6).

Polyporus albiceps Peck is considered to be merely a diminutive form of this species, somewhat modified, perhaps, by its habit of growing on buried wood.

Illustrations: Dodge, Mycologia 8:14. *pl. 173* and *174. f. 2.* 1916.
Type of rot: heart rot of apple, see Dodge, Mycologia 8:5–15 1916.

B. Surface of pileus yellowish to dark brown.

2. Polyporus varius (Pers.) Fries

P. calceolus (Bull.) Murr.

Stem excentric to lateral, rarely central, black at the base, velvety to glabrous, 1-4 cm. long, 0.4-1 cm. thick; **pileus** leathery to rigid, circular to flabelliform or reniform in outline, convex to nearly plane, or sometimes depressed at the center, 3-10 cm. in diameter, 0.2-1 cm. thick; surface ochraceous to reddish tan or light reddish brown, glabrous or nearly so, distinctly radially striate with darker fibrils; margin thin, acute or obtuse, often narrowly sterile below; **context** white to cream color, corky, 2-7 mm. thick, the hyphae somewhat branched, thick-walled, 3-5 μ in diameter; **tubes** decurrent, white to brownish or darker, 1-4 mm. long, the mouths concolorous, circular to angular, 4-5 per mm., the edges at first thick, thinning with age, entire; cystidia none; basidia 5-7 μ in diameter; **spores** hyaline, smooth, cylindrical, sometimes slightly curved, 7-10 $\times$ 2.5-3.5 μ.

On the trunks of deciduous trees. Summer and fall. Apparently rare, or has been confused with *P. elegans*, which is usually thinner with striations entirely absent or very faint.

The above description applies to the species as it is now understood in America, following Shope (**19**, pp. 358, 359). It should be noted, however, that the American and the European conceptions are not the same. In Europe, according to Lloyd (5, p. 180) the pileus of *P. varius* is dark bay to almost black, and *P. picipes* is the name applied in the United States to a thin dark form of *P. varius*.

Illustrations: Shope, Ann. Missouri Bot. Gard. 18:432. *pl. 27, f. 4–7.* 1931.

3. Polyporus elegans (Bull.) Fries

P. elegans var. *brevipes* H. D. House

Stem central to lateral, black at the base, pruinose or glabrous, 0.2-8 cm. long, 0.2-1 cm. thick; **pileus** leathery when fresh, rigid when dry, circular to reniform or flabelliform, sometimes with a depressed center, or convex to nearly plane, 1-9 cm. broad, 0.2-1 cm. thick; surface pale ochraceous or dull orange, pruinose to glabrous, often somewhat faintly radiate-striate, but never markedly so; margin thin, frequently sterile below in young specimens; **context** white to pallid, corky, 1-6 mm. thick, the hyphae rarely to moderately branched, thick-walled, 3-5 μ in diameter; **tubes** decurrent, whitish, becoming yellowish or yellowish brown when dry, 1-3 mm. long, mouths concolorous, circular to angular,

averaging 4-5 per mm., the edges becoming moderately thick, entire; cystidia none; basidia 7-8.5 μ in diameter; **spores** hyaline, smooth, cylindrical, 6-8 $\times$ 2.5-3.5 μ.

On the wood of deciduous trees. Common. Summer and fall.

Illustrations: Lloyd, Mycol. Notes 64: *pl. 167, f. 1833–1835.* 1920; Overholts, Wash. Univ. Studies 3:84. *pl. 1, f. 1, a-c.* 1915; Shope, Ann. Missouri Bot. Gard. 18:432. *pl. 27, f. 1–2.* 1931.

4. **Polyporus picipes** Fries

P. fissus Berk.

Stem central to excentric, black at the base or more often black to the pores, at first velvety, becoming almost glabrous, usually minutely punctate, 1-5 cm. long, 0.5-1.5 cm. thick; **pileus** leathery when fresh, rigid and brittle when dry, circular to reniform, convex to depressed or infundibuliform, 5-20 cm. broad, 0.2-0.8 cm. thick; surface chestnut-brown or reddish brown or darker, rarely yellowish brown, usually darker in the center, glabrous, azonate; margin very thin, usually darkening on drying, fertile below; **context** white or pallid, tough when fresh, firm to hard when dry, 1-7 mm. thick, the hyphae rarely to moderately branched, thick-walled, 2-4 μ in diameter; **tubes** decurrent, white to brownish, 1-3 mm. long, mouths concolorous, at first circular, then angular, with age becoming more or less confluent and daedaloid, averaging 6-8 per mm., the edges moderately thick, entire; cystidia none; basidia 6-8 μ in diameter; **spores** hyaline, smooth, cylindric-ellipsoid, 5.5-7 $\times$ 2-3 μ.

On stumps and logs of deciduous or rarely of coniferous trees. Common. Summer and fall. Compare with *P. melanopus.*

Illustrations: Hard, Mushrooms, p. 388, *f. 319.* 1908; Moffat, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 12, f. 2.* 1909; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:184. *pl. 14, f. 52, a–b.* 1914.

5. **Polyporus melanopus** (Swartz) Fries

Scutiger subradicatus Murr.

Stem central or eccentric, unbranched or rarely branched once or twice, black to the tubes, minutely tomentose, usually slender, sometimes thickened, 2-4 cm. long, 0.6-2.5 cm. thick; **pileus** fleshy-tough when fresh, rigid and brittle when dry, irregular in outline, convex to plane or infundibuliform, 3-12 cm. broad, 0.3-0.8 cm. thick; surface at first yellowish, soon changing to yellowish brown or dark brown, with fine appressed fibrils giving a more or less reticulate appearance to the surface, or almost glabrous, azonate; margin thin, acute, fertile below; **context** white, fleshy-tough when fresh, friable when dry, 1-7 mm. thick, the hyphae rarely to somewhat branched, of two kinds: some thin-

walled, irregular, 3-11 μ in diameter, others thick-walled, 3-6 μ; **tubes** decurrent, white, yellowish when dry, up to 1 mm. long, mouths concolorous, regularly angular or breaking up to form extra large pores, or elongate and more or less sinuous, averaging 3-4 per mm., the edges moderately thick to thin, entire to fimbriate; cystidia none; basidia 6-8 μ in diameter; **spores** hyaline, smooth, cylindrical to ellipsoid, 7-10 $\times$ 3-4 μ.

On the ground attached to buried wood. Apparently rather rare. Summer and fall. Similar to *P. picipes*, but differs in growing on the ground, and in usually being a thicker plant. Spores from the type of *S. subradicatus* measured 6.5–9.5 $\times$ 3–3.5 μ, rather than 5-7 $\times$ 3-4 μ, as given by Murrill (*Bull. Torrey Bot. Club* 30:430. 1903.)

Illustrations: Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:184. *pl. 14, f. 53.* 1914 (as *P. subradicatus*).

II. Pores 2-3 per mm. or larger; spores 4-8 μ wide.

6. Polyporus radicatus Schw.

P. morgani Frost; *P. morgani* var. *velutipes* Peck; *Scutiger radicatus* (Schw.) Murr.

Stem central, unbranched or rarely branching once or twice, black at the base, rooting, velvety to squamulose, 5-15 cm. long, 0.5-2 cm. thick; **pileus** fleshy-tough when fresh, fragile when dry, circular in outline, convex to depressed, 3-20 cm. wide, 0.3-2 cm. thick; surface yellowish brown to dark blackish brown, fibrillose-scaly to squamulose, or minutely scabrous, azonate; margin thin and acute, often involute on drying, fertile below; **context** white or light yellowish, spongy when fresh, soft and friable when dry, 3-15 mm. thick, the hyphae rarely to somewhat branched, thin-walled, 2-10 μ in diameter; **tubes** decurrent, white when fresh, becoming yellowish brown on drying, 1-5 mm. long, mouths concolorous, angular to sinuous, averaging 2-3 per mm., the edges thin, lacerate; cystidia none; basidia 10.5-13 μ in diameter; **spores** hyaline, smooth, ovoid-ellipsoid to subfusiform, 12-15 $\times$ 6-8 μ.

On the ground attached to buried roots. Uncommon. Summer and fall. The black, rooting stem is a distinctive character.

Illustrations: Hard, Mushrooms, p. 400, *f. 329.* 1908; Lloyd, Synop. Sect. Ovinus, p. 88: *f. 508.* 1911, and the same in Synop. Stip. Polyp., p. 169, *f. 465.* 1912; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:186. *pl. 15, f. 54.* 1914.

7. Polyporus squamosus (Huds.) Fries

P. caudicinus (Scop.) Murr.

Stem lateral or sometimes excentric to central, often rudimentary, black at the base, whitish or yellowish and reticulate above, 1-5 cm. long, 1 cm. or more thick; **pileus** somewhat fleshy when

fresh, drying hard and brittle, dimidiate, reniform or becoming flabelliform, 5-25 cm. broad, 0.5-4 cm. thick; surface whitish or discoloring to yellowish or brownish, smooth but with large appressed scales which are somewhat darker and often concentrically arranged, glabrous; margin thin, acute, fertile below; **context** white, soft when fresh, drying spongy-friable to corky-fragile, 0.5-3 cm. thick, the hyphae occasionally branched, thin-walled to thick-walled, 3-8 μ in diameter; **tubes** decurrent, white to yellowish, or darker on drying, at first shallow pits or reticulations, becoming up to 8 mm. long, mouths concolorous, large and angular, 1-2.5 mm. broad, the edges thin, entire to dentate or lacerate; cystidia none; basidia 7-9 μ broad; **spores** hyaline, smooth, elongate-ovoid to ellipsoid, apiculate, 12-16 $\times$ 4.5-6 μ.

On living or dead deciduous trees. Rather rare. Spring. This species and related forms have been redescribed recently by Graff (*Mycologia* 28:154-170. 1936).

Illustrations: Duggar, Fung. Dis. Plants, p. 454, *f. 223*, and p. 455, *f. 224*. 1909; Hard, Mushrooms, p. 396, *f. 325*. 1908; Hesler, Jour. Tennessee Acad. Sci. 4:5. *f. 2*. 1929; Lloyd, Photogravure Amer. Fungi, *Issue No. 5;* Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:184. *pl. 14, f. 51 b*, and p. 186, *pl. 15, f. 51 a*. 1914; Shope, Ann. Missouri Bot. Gard. 18:436. *pl. 29, f. 1-2*. 1931.

Type of rot: white rot, see Buller, Jour. Econ. Biol. 1:101-138. 1906 (biology), Price, New Phytologist 12:269-281. 1913, and von Schrenk and Spaulding (**17,** pp. 48, 49).

7a. **Polyporus squamosus** var. **glaber** (Batt.) Graff

P. pennsylvanicus Sums.

Stem excentric, pallid to reddish with blackish stains, more or less concolorous throughout, 2-4 cm. long, 0.8-1.2 cm. thick, "-2.5 cm." (Graff); **pileus** circular to irregular, 4-8 cm. broad, 0.3-0.5 cm. thick; surface light tan, entirely without scales, azonate; **context** white to pallid, soft and punky to somewhat fragile when dry, 2-4 mm. thick, the hyphae usually thick-walled, rarely branched, 3-9 μ in diameter, sometimes thin-walled, more often branched, 4-10 μ; **tubes** decurrent, concolorous or darker, 1-3 mm. long, "-6 mm." (Graff), mouths concolorous, angular, radially elongated, 0.8-1 mm. broad, "-2.5 mm." (Graff), the edges thin, entire to toothed; hyphal pegs 30-80 μ in diameter, projecting 50-110 μ; cystidia not observed; basidia 9-11 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 11-15 $\times$ 4-5 μ.

On the wood of deciduous trees. Uncommon. Summer. The specimens (two collections at Albany) forming the basis of this report have been variously named. Peck referred them to *P. pallidus* Schulz.; Lloyd referred the same specimens to *P. rostkovii*. The name accepted as valid is used on the authority of Graff (*Mycologia* 28:165. 1936).

7b. Polyporus squamosus var. **fagicola** (Murr.) Graff

Stem central, white to brownish, conspicuously hispid, especially near the base, 2-4 cm. long, 1 cm. thick; **pileus** fleshy-tough when fresh, rigid and fragile when dry, circular, convex to plane, umbilicate, 4-6.5 cm. broad, 0.1-0.3 cm. thick; surface pale brown or light yellowish brown, with tufts of small innate fibrils which are larger and darker near the center and sometimes are radially and imbricately arranged, or nearly smooth, azonate, much wrinkled on drying; margin thin, fertile below; **context** white, fibrous, when dry 1-2 mm. thick, the hyphae occasionally branched, usually thin-walled, often varying abruptly in thickness, 3-12 μ in diameter; **tubes** decurrent, white or whitish, about 1 mm. long, "-2.5 mm." (Graff), mouths concolorous, angular, 1-2 per mm., the edges very thin, minutely fimbriate; cystidia-like bodies present, 7-8 μ in diameter, projecting up to 20 μ; basidia 7-8 μ in diameter; **spores** hyaline, smooth, cylindric-ellipsoid to subfusiform, 11-15 $\times$ 4.5-5.5 μ.

On limbs, recorded only on beech, Arkville, W. A. Murrill. Through the courtesy of Dr. F. J. Seaver a part of the type specimen was loaned for study. The spores measure as above, rather than 6-7 $\times$ 3-4 μ, as stated by Murrill (*Torreya* 6:35. 1906).

Illustrations: Lowe, Papers Michigan Acad. Sci., Arts, Lett. 19. *pl. 15, f. 3-4.* 1934.

Series 2. Stem not black at the base nor black throughout, white or variously colored, more or less concolorous throughout.

I. Stem unbranched, or rarely branching once or twice.

A. Context duplex, firm below, spongy above (compare also 78. P. borealis).

8. Polyporus humilis Peck

Stem usually lateral or nearly so, white, minutely tomentose, 2-4 cm. long, 0.2-1 cm. thick; **pileus** soft and flexible when fresh, spathulate or flabelliform to reniform or circular, 1-5 cm. broad, 0.1-0.4 cm. thick; surface white, finely tomentose, azonate, somewhat wrinkled on drying; margin thick to thin, acute to obtuse, sterile below; **context** white, duplex, firm next the tubes, soft and spongy above, 0.5-2 mm. thick, the hyphae rarely branched, thin-walled, 2-5 μ in diameter; **tubes** decurrent, white, rarely in two layers, 0.5-2 mm. long, mouths concolorous, angular, averaging 4-5 per mm., the edges thin, entire; cystidia-like bodies present, very inconspicuous, 2-5 μ in diameter; basidia 5.5-8 μ in diameter; **spores** hyaline, smooth, apiculate, ovoid to subglobose, 4.5-5.5 $\times$ 4-5 μ.

On old sticks and branches on the ground. Rare. Summer and fall.

Illustrations: Lloyd, Mycol. Notes 56:805. *f. 1252.* 1918 (typical); Overholts, Wash. Univ. Studies 3:84. *pl. 1, f. 4.* 1915.

9. **Polyporus biennis** var. **distortus** (Schw.) Graff

P. abortivus Peck; *Abortiporus distortus* (Schw.) Murr.

Stem central to lateral, or wanting, surface white to tan or reddish, tomentose, when well developed up to 5 cm. long, but often rudimentary and tubercular; **pileus** fleshy-tough to coriaceous, variable in form and size, when well developed with a circular pileus 2-8 cm. broad, 0.4-1.5 cm. thick, sometimes narrow infundibuliform, often distorted and the tubes almost to entirely covering the surface; surface white to tan or reddish, villose-tomentose, sometimes almost glabrous, azonate; margin thin to thick, acute to obtuse, sterile or fertile below; **context** white when fresh, light brown when dry, duplex in well developed specimens, the layer next the tubes firm and corky, lighter colored and softer above, 0.2-1 cm. thick, the hyphae rarely or frequently branched, thin-walled to thick-walled, 3-8 μ in diameter; **tubes** whitish, darkening somewhat on drying, 1-6 mm. long, mouths more or less concolorous, when fresh reddish where bruised, angular to daedaloid or irregular, averaging 1-3 per mm., the edges thin, entire; **cystidia** usually present, sometimes incrusted at the tips, 6-10 μ in diameter, scarcely projecting beyond the hymenium and sometimes buried in the tramal tissue; basidia 4-5 μ in diameter; **spores** hyaline, smooth, apiculate, ellipsoid to ovoid, 5-8 $\times$ 3.5-7 μ.

On the ground about stumps and trunks of deciduous trees, recorded only about butternut. Uncommon. Summer and fall. According to Lloyd (**5**, p. 158) this is a form of *P. rufescens* (Pers.) Fries of Europe. Graff (*Mycologia* 31:466-484. 1939) has recently studied this plant and its allied species and his disposition is here followed. The writer has seen very few European specimens of these related species.

Illustrations: Lloyd, Synop. Stip. Polyp. p. 158, *f. 456* (as *P. rufescens*), and p. 159, *f. 458.* 1912, also in Mycol. Notes 40:549. *f. 753.* 1916, and in Mycol. Notes 69: *pl. 236, f. 2395.* 1923 (as *P. rufescens*); Overholts, Wash. Univ. Studies 3:84. *pl. 1, f. 3, a-b.* 1915.

Polyporus ballouii Lloyd. A form of *P. biennis* var. *distortus* with small pores (averaging 3-5 per mm.) and more variable spores (mostly 4-4.5 $\times$ 2-3 μ, some 6 $\times$ 7 μ, or "5-7 $\times$ 3-5 (6 $\times$ 4) μ" (Graff). Graff (*Mycologia* 31:480. 1939) considers this plant to be of varietal rank under *P. biennis*, differing from var. *distortus* by its thinner and more leathery pileus as well as by the pore and spore characters given above. According to Lloyd (*Letter* 58:7. 1915) *P. tropicalis* Murr. is the same as *P. ballouii* but it differs in having much smaller pores, 10-12 per mm., and the spores regularly smaller,

4-6 × 4-5 μ, or "4-7 × 2-6 (6 × 4) μ" (Graff). Graff (as above, p. 481) considers *P. tropicalis* a variety of *P. biennis.*

Illustrations: Lloyd, Mycol. Notes 69: *pl. 236, f. 2395-2396.* 1923.

B. Context homogeneous.

1. Stem lateral, or pilei pendant.

a. Context 0.3-3.5 cm. thick; stem usually lateral (compare also 21. P. confluens; 22. P. cristatus; and 26. P. berkeleyi).

10. **Polyporus betulinus** (Bull.) Fries

Piptoporus suberosus (L.) Murr.

Stem when present represented by a rather stout lateral umbo, or rarely pileus centrally attached and pendant, sometimes nearly sessile; **pileus** fleshy-tough to corky, dimidiate or reniform to circular, 3-15 × 3-20 × 1-5 cm.; surface covered with a tan, or grayish brown, or smoky pellicle, smooth, glabrous, azonate; margin incurved, projecting beyond the pore surface as a wide sterile band; **context** white, somewhat fleshy when fresh, soft-corky when dry, 1-3.5 cm. thick, the hyphae rarely branched, thick-walled, 3-5 μ in diameter; **tubes** white, becoming darker in old specimens, 3-9 mm. long, separating rather readily from the context, mouths white, often darkening to almost black in old specimens, circular to angular, averaging 3-4 per mm., the edges at first thick and obtuse, becoming thin and irregularly cut with age; pore surface at times covered with projecting clumps of agglutinated dissepiments simulating teeth; cystidia "thick-walled and lanceolate with bluntish points. . . . protrud[ing] very considerably into the pore space" (Macdonald); basidia 3-5 μ in diameter; **spores** hyaline, smooth, allantoid, 4-5 × 1.5-2 μ.

On birch trees. Common. Summer and fall.

Illustrations: Hard, Mushrooms, p. 408, *f. 337.* 1908; Lloyd, Synop. Apus Polyporus, p. 294, *f. 631-632.* 1915; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:182. *pl. 13, f. 46, a-b.* 1914; von Schrenk and Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull. 149: *pl. 9, f. 1-2.* 1909; White, Connecticut Geol. and Nat. Hist. Surv. Bull. 3:65. *pl. 37.* 1905.

Type of rot: powdery sapwood rot of birches, see Hemmi and Kurata, Forst. auf dem Gebeit der Pflanzenkr. I (Kyote), 1931, pp. 206-224; Macdonald, Ann. Appl. Biol. 24:289-310. 1937; Rankin (**16**, pp. 113-115); and von Schrenk and Spaulding (**17**, pp. 51, 52).

11. **Polyporus osseus** Kalchbr.

Pilei substipitate, narrowed to a lateral stem-like base, fleshy-tough when fresh, bone hard when dry, sometimes imbricate, 1-6 × 2-8 × 0.3-1 cm.; surface white to light gray or brownish, drying somewhat darker and wrinkled, minutely tomentose to nearly glabrous, azonate; margin thin, fertile below; **context** white, firm

when fresh, drying bone hard, 3-7 mm. thick, the hyphae much branched, thick-walled, irregular, 5-10 μ in diameter; **tubes** decurrent, white to ochraceous, 1-3 mm. long, mouths concolorous with the tubes, angular, averaging 4-6 per mm., the edges thin, becoming lacerate; cystidia none; basidia 4-5 μ in diameter; **spores** hyaline, smooth, cylindrical, 4-7 $\times$ 2-2.5 μ.

On the stumps and roots of coniferous trees, recorded on white pine and pine unclassified. Occasional. Summer and early fall.

Illustrations: Lloyd, Synop. Stip. Polyp., p. 188, *f. 496.* 1912; Shope, Ann. Missouri Bot. Gard. 18:436. *pl. 29, f. 3.* 1931.

12. **Polyporus hirtus** Quél.

P. hispidellus Peck; *Scutiger hispidellus* (Peck) Murr.

Stem lateral, rarely excentric, often irregular, whitish or brownish, hispid, 2-3 cm. long, 1-2.5 cm. thick; **pilei** usually solitary, fleshy-tough, circular or subcircular to more or less reniform, 5-8 cm. broad, 0.5-1.5 cm. thick; surface grayish brown or brown, minutely hispid, azonate, smooth, areolate or squamulose with age; margin thin and acute, fertile below; **context** white, soft when fresh, drying rather hard, 3-10 mm. thick, the hyphae occasionally to often branched, thin-walled, irregular, 4-8 μ in diameter, occasionally larger; **tubes** decurrent, white, drying darker, occasionally blackish where bruised, 3-10 mm. long, mouths concolorous with the tubes, angular or irregular, averaging about 2 per mm., the edges becoming thin, dentate; cystidia none; basidia 8-10 μ in diameter; **spores** hyaline, smooth, subfusiform, 12-16 $\times$ 4-6 μ.

Around the base of coniferous trees or stumps, or attached to buried wood. Rare, but two collections known, both from near North Elba. The species is more abundant in the western United States.

Illustrations: Lloyd, Synop. Stip. Polyp., p. 129, *f. 126.* 1912; Shope, Ann. Missouri Bot. Gard. 18:432, *pl. 27, f. 3.* 1931.

b. Context 0.5-2 mm. thick; pilei usually pendant (compare also laterally stipitate or substipitate species 57. P. rhipidium; 67. P. conchifer; 70. P. semisupinus; 71. P. floriformis; and 72. P. balsameus).

13. **Polyporus pocula** (Schw.) Berk. and Curt.

P. cupulaeformis Berk. and Curt.; *Porodiscus pendulus* (Schw.) Murr.; *Porodisculus pendulus* (Schw.) Murr.

Stem dorsally attached and expanding into the pileus, pendant from dead branches, whitish to brown, pruinose or mealy, not more than 5 mm. long; **pileus** coriaceous when fresh, rigid when dry, circular in outline, 2-5 mm. broad, 1-3 mm. thick; surface brownish, or sometimes whitish pruinose or mealy, azonate; mar-

gin thick, inrolled, forming a wide sterile band around the pore surface; **context** white, leathery when fresh, hard when dry, less than 1 mm. thick, with large, thin-walled, subglobose to elongated vesicular bodies 8-19 μ in diameter, occurring free in the context (?chlamydospores), or apparently the swollen ends of hyphae, the context hyphae rarely to somewhat branched, thin-to rather thick-walled, 3-5 μ in diameter; **tubes** whitish or brownish, not more than 0.75 mm. long, mouths whitish or brownish, at first pruinose, circular, averaging 5-6 per mm., the edges thick, composed of a mass of strongly incrusted hyphal tips; cystidia none; basidia 3-3.5 μ in diameter; **spores** allantoid, hyaline, 3-4 $\times$ 1-1.5 μ.

On branches of deciduous trees. Frequent. Summer and fall. According to Overholts (9, p. 15) this is the smallest polypore known.

Illustrations: Lloyd, Polyp. Issue 3:45, *f. 369*, and p. 46, *f. 370*. 1910, also in Synop. Stip. Polyp., p. 140. *f. 113*. 1912, and in Mycol. Notes 41:569. *f. 777*. 1916.

14. Polyporus subpendulus Atk.

Tyromyces subpendulus Atk.

Stem short, broadening into the vertex of the pileus, often pendant, whitish, glabrous, cylindrical, 1-2 mm. long; **pileus** fibrous-fleshy when fresh, firm and friable when dry, convex, ungulate to subapplanate, sometimes laterally confluent, 3-6 $\times$ 5-10 $\times$ 2-6 mm.; surface white with sordid pale yellow stains, glabrous, subpelliculose, nearly smooth, radiately rugose with the wrinkles often stained more deeply and sometimes slightly anastomosing behind; margin obtuse, usually entirely surrounding the pore surface, about 1 mm. wide; **context** white, radiately fibrous, friable, azonate, 0.5-2 mm. thick, thinner toward the margin, "the hyphae 3-5 μ in diameter except for some larger staining, inflated hyphae up to 10 μ or more at the inflations" (Overholts); **tubes** pale cream color, about 2 mm. long, mouths white or whitish, circular to irregular, especially at the margins, 6-8 per mm., the edges thin, entire to slightly dentate; cystidia none; basidia "5-6 μ diameter" (Overholts); **spores** "hyaline, smooth, elliptical, straight or slightly curved, . . ., 4-5 $\times$ 2 μ" (Atkinson), "cylindric, flattened on one side or slightly curved" (Overholts).

On hemlock, known only from the type collection, Ithaca. J. M. Hook. October. The above description was drawn in part from notes on the type specimen, in part from Atkinson's original description (*Ann. Mycol.* 6:61, 62. 1908) and from notes by Overholts found with the type specimen, published with his permission.

2. Stem central to excentric, rarely truly lateral.

a. Pilei when fresh more or less coriaceous or fleshy-tough; usually epixylous (compare also 1. P. admirabilis; 7a. P. squamosus var. *glaber; and 7b. P. squamosus* var. *fagicola).*

15. Polyporus peckianus Cooke

P. flavidus Peck; *Polystictus peckianus* (Cooke) Sacc.; *Grifola fractipes* (Berk. and Curt.) Murr. sense No. Amer. Flora 9:69. 1907 in part.

Stem central to excentric, sometimes branched, pallid, glabrous, 2-4 cm. long, 0.5-1.5 cm. thick; **pileus** fleshy-tough when fresh, rigid and brittle when dry, depressed to infundibuliform, more or less circular to flabelliform, 4-10 cm. broad, 0.2-0.5 cm. thick; surface yellow to more or less ochraceous or brownish when dry, nearly glabrous, zonate to azonate; margin thin, acute, sterile below; **context** white, firm and fragile when dry, 1-2 mm. thick, the hyphae often branched, thin-walled, very irregular, 4-15 μ in diameter; **tubes** decurrent, white to pale yellowish, varying to ochraceous when dry, 1-3 mm. long, mouths concolorous, angular, averaging 4-5 per mm., the edges thin, finely dentate; cystidia none; basidia 4-5 μ in diameter; **spores** hyaline, smooth, sometimes one-guttulate, ovoid to subglobose, 3-3.5 $\times$ 2-2.5 μ.

On the ground or attached to buried wood, recorded only about basswood. Rare. Summer.

16. Polyporus arcularius (Batsch) Fries

Stem central, yellowish brown to dark brown, squamulose to glabrous, sometimes hispid at the base, 2-6 cm. long, 0.2-0.4 cm. thick; **pileus** fleshy-tough when fresh, rather brittle when dry, circular, convex to depressed or infundibuliform, 2-8 cm. broad, 0.2-0.4 cm. thick; surface light brown to yellowish brown or dark brown, squamulose, hispid-tomentose to glabrous, azonate; margin acute, often ciliate, usually fertile below; **context** white, soft fleshy-fibrous when fresh, drying firm and fragile, 0.5-2 mm. thick, the hyphae rarely to frequently branched, usually thick-walled, frequently irregular, 2-10 μ in diameter; **tubes** sometimes decurrent, white to pallid, darker when dry, 1-2 mm. long, mouths concolorous, angular, often radially elongated, averaging 1-2 per mm., the edges thin, very finely dentate; cystidia none; hyphal pegs projecting up to 50 μ, up to 30 μ in diameter; basidia 5-6 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 6-9 $\times$ 2-3 μ.

On the wood of deciduous trees. Apparently rare. Spring and early summer, rarely in the fall and then with slender stem and thin small pileus with scattered marginal cilia (*P. arculariellus* of Murrill).

Illustrations: Hard, Mushrooms, p. 407, *f. 336.* 1908; Overholts, Wash. Univ. Studies 3:84. *pl. 1, f. 2, a-c.* 1915; Shope, Ann. Missouri Bot. Gard. 18:426. *pl. 24, f. 5-6.* 1931.

17. Polyporus brumalis (Pers.) Fries

P. polyporus (Retz.) Murr.

Stem central to excentric, grayish or brownish, minutely hispid, 1-3 cm. long, 0.2-0.3 cm. thick; **pileus** fleshy-tough when fresh,

rigid and rather brittle when dry, circular, convex to depressed, 2-6 cm. broad, 0.2-0.4 cm. thick; surface yellowish brown to dark brown or almost black, minutely hispid to glabrous, usually azonate but sometimes distinctly zoned; margin thin, fertile below; **context** white, tough when fresh, firm and rather fragile when dry, 1-2 mm. thick, the hyphae rarely to somewhat branched, thick-walled, 2-5 μ in diameter; **tubes** usually slightly decurrent, whitish when fresh, becoming light brown on drying, 1-3 mm. long, mouths concolorous, circular, becoming angular, often radially elongated, averaging 2-3 per mm., the edges at first thick, becoming rather thin, entire; cystidia none; hyphal pegs scattered, up to 30 μ wide, projecting up to 30 μ; basidia 4-5 μ in diameter; **spores** hyaline, smooth, cylindrical, slightly apiculate, 5-7 $\times$ 1.5-2 μ.

On wood of deciduous trees. Common. Summer and fall.

Illustrations: Atkinson, Mushrooms, ed. 3, p. 191. *pl. 71, f. 186.* 1911; Hard, Mushrooms, p. 406, *f. 335.* 1908; Moffatt, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7. I: *pl. 12, f. 1.* 1909; Murrill, Mycologia 10:107. *pl. 6, f. 3.* 1918; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:182. *pl. 13, f. 47, a-b.* 1914.

b. Pilei when fresh fleshy to firm fleshy; terrestrial.

18. **Polyporus griseus** Peck

Scutiger griseus (Peck) Murr.

Stem central, surface more or less grayish, short bulbous at the base, 4-5 cm. long, 1-1.5 cm. thick; **pileus** firm-fleshy when fresh, circular or often irregular, convex, 7-12 cm. broad, 1 cm. or less thick; surface more or less grayish or bluish-gray, slightly darker toward the center, glabrous to minutely tomentose, dry, azonate, wrinkled on drying; margin thin, fertile below; **context** rosy-gray when fresh, darkening on drying, soft-fleshy when fresh, soft and friable to hard and fragile when dry, about 5 mm. thick, the hyphae often branched, thin-walled, irregular, 4-15 μ in diameter; **tubes** slightly decurrent, whitish to olivaceous brown or dark brown, 1-2 mm. long, mouths white when young, becoming gray to dark brown, subangular, unequal, 2-4 per mm., the edges thin, entire to fimbriate, lacerate with age; cystidia none; basidia 6-7 μ in diameter; **spores** hyaline, coarsely tubercular, broadly ellipsoid to subglobose, 5-6 $\times$ 4.5-5 μ.

On the ground under trees. Rare. Fall. This species has been placed in synonymy with *P. subsquamosus* (L.) Fries (or *P. leucomelas* var. *subsquamosus* [L.]), see A. Pilát, *Beih. Bot. Centralbl. Bd. 48. Abt. II. p. 426. 1931.* Tubercular spores are known among the polypores only in *P. leucomelas* and in *P. griseus* (= *subsquamosus*) according to Lloyd (**4**, p. 78, footnote 9).

Illustrations: Lloyd, Synop. Sect. Ovinus, p. 78, *f. 499-500.* 1911.

19. Polyporus caeruleoporus Peck

Scutiger caeruleoporus (Peck) Murr.

Stem central or excentric to nearly lateral, more or less blue or bluish, glabrous, 2.5-5 cm. long, about 0.5 cm. thick; **pileus** fleshy, convex, more or less circular, 2.5-5 × 0.3-1 cm.; surface bright violaceous, blue, smoky indigo, or grayish blue, dry, glabrous, when dry bluish-black or grayish-blue; margin lobed, fertile below; **context** white, 1-5 mm. thick, the hyphae often branched, thin-walled, variable in size, 2.5-6 μ in diameter; **tubes** decurrent, pale blue, 2-5 mm. long, mouths pale indigo blue or bright bluish color when fresh, fading on drying to brown, angular, averaging 2-3 per mm., the edges thin, entire to fimbriate; cystidia none; basidia 6 μ in diameter; **spores** hyaline, smooth, subglobose, 3.5-5 μ.

On the ground in woods. Rare. Fall. The above description is based in part, especially with regard to the character of the fresh specimen, on Overholts' Notes (*Bull. Torrey Bot. Club* 49:169, 170. 1922.

20. Polyporus ovinus (Schaeff.) Fries

Scutiger ovinus (Schaeff.) Murr.

Stem central or excentric, whitish to tan colored, drying darker, often black spotted, tomentose, usually with a bulbous base, 2-6 cm. long, 1-2 cm. thick; **pilei** usually solitary, firm-fleshy when fresh, drying fragile, circular, convex, 4-10 cm. in diameter, 0.3-1 cm. thick; surface white to tan colored, dull, drying light brown to grayish brown or darker, often black spotted, at first tomentose, with age becoming more or less glabrous and areolate or subsquamulose; margin acute, sterile below; **context** at first white, drying light pinkish brown with a distinct tint of gray on smooth section, or sometimes black or blackish, firm when fresh, drying firm to hard and fragile, often containing a black line adjacent to the tubes, 1-6 mm. thick, the hyphae often branched, thin-walled, of markedly unequal diameters, varying from 4 μ up to 25 μ; **tubes** decurrent, at first whitish, drying light brown to yellowish brown or chestnut brown, often olivaceous black, 1-3 mm. long, mouths concolorous, angular, 2-3 per mm., the edges becoming dentate with age, moderately thin; cystidia none; basidia "3-4 μ in diameter" (Shope); **spores** hyaline, smooth, apiculate, often one-guttulate, ovoid to subglobose, 3.5-4.5 × 2.5-3.5 μ.

On the ground in coniferous woods. Rare. Late summer and early fall.

Illustrations: Lloyd, Synop. Sect. Ovinus, p. 77, *f. 497.* 1911; Shope, Ann. Missouri Bot. Gard. 18:426. *pl. 24, f. 2.* 1931.

21. Polyporus confluens (Alb. and Schw.) Fries

Scutiger whiteae Murr.

Stem central to excentric, rarely lateral, unbranched or more often branched and confluent, whitish or pinkish to brownish or

reddish, glabrous, circular to somewhat compressed, 1.5-3 cm. thick, up to 4 cm. long; **pilei** caespitose or rarely solitary, fleshy, watery but rather firm when fresh, drying rather hard and brittle, circular to irregular, sometimes flabelliform or nearly reniform, convex to plane or slightly depressed, 5-15 cm. in diameter, 0.5-1.5 cm. thick; surface uniformly very light tan to dark cream when fresh, drying with a distinct reddish color, or sometimes cinnamon brown, very minutely tomentose to glabrous, with age sometimes becoming more or less areolate or scaly; margin thin, fertile below; **context** white, fleshy-tough and watery when fresh, drying pinkish or varying to dark resinous red, usually shrinking much on drying, firm and fragile to hard and brittle, sometimes with a reddish orange layer next the tubes, up to 10 mm. thick, the hyphae often branched, thin-walled, very irregular, 3-8 μ in diameter, occasionally up to 18 μ; **tubes** decurrent, white, with a pinkish cast on bruising, becoming scarlet or cinnamon brown on drying, 1-3 mm. long, mouths concolorous, angular, 2-3 per mm., the edges becoming thin, fimbriate; cystidia none; basidia "5.5 μ in diameter" (Hirt); **spores** hyaline, smooth, apiculate, broadly ellipsoid to subglobose, or sometimes somewhat cylindric-ellipsoid, 3.5-5 $\times$ 2.5-4 μ.

On the ground in woods. Rare. Summer and early fall. When growing singly it is difficult to distinguish from *P. ovinus*, but it usually can be identified by the color changes on drying. Specimens of one collection referred to this species had hollow stems, a character not mentioned in the literature.

Illustrations: Kaufman, Papers Michigan Acad. Sci., Arts, Lett. 1:150. *pl. 34.* 1923; Shope, Ann. Missouri Bot. Gard. 18:434. *pl. 28, f. 1.* 1931.

22. **Polyporus cristatus** (Pers.) Fries

P. flavovirens Berk. and Rav.; *Grifola cristata* (Pers.) S. F. Gray; *G. flavovirens* (Berk. and Rav.) Murr.; *G. poripes* (Fries) Murr.

Stem usually excentric but sometimes central, rarely almost lateral, normally unbranched, more rarely branched, often irregular in form, whitish or yellowish, 2-5 cm. long, 1-2.5 cm. thick; **pileus** fleshy, circular to irregular, convex to plane or depressed, 5-20 cm. broad, 0.3-1.5 cm. thick; surface yellowish green or yellowish brown, sometimes yellow at the center and brown on the margin, becoming cracked and areolate, slightly tomentose to glabrous, azonate; margin thin and acute, fertile below; **context** white, whitish, or yellow when dry, usually drying firm and fragile, 2-10 mm. thick, the hyphae often branched, thin-walled, very irregular, 5-20 μ or more in diameter; **tubes** decurrent, whitish, yellowish or brownish, occasionally brick-red on drying, sometimes becoming dark resinous-appearing at the base and separated from the context by a thin dark line when dry, 1-5 mm. long, mouths concolorous, circular to angular, averaging 2-3 per mm., the edges thin, entire; cystidia none; basidia 5.5-8 μ in

diameter; **spores** hyaline, smooth, apiculate, one-guttulate, ovoid to subglobose, 4-6 × 3.5-4.5 μ.

On the ground in woods. Uncommon. Summer and fall.

Illustrations: Hard, Mushrooms, p. 398, *f. 327.* 1908 (as *P. flavovirens*); Lloyd, Synop. Sect. Ovinus, p. 80, *f. 501.* 1911; Overholts, Wash. Univ. Studies 3:84. *pl. 1, f. 5, a-b.* 1915.

II. Stem few to many times branched, with few large or many small pilei (compare also 21. P. confluens; 22. P. cristatus; and 78. P. borealis).

23. **Polyporus umbellatus** (Pers.) Fries

Cladomeris ramosissima (Scop.) Murr.; *Grifola ramosissima* (Scop.) Murr.

Stem "arising from an underground tuber or sclerotium of irregular shape" (Overholts), the part above ground branching repeatedly and terminating in many centrally to subcentrally attached pilei and forming a fruiting body up to 20 cm. in diameter, the branches cylindrical, entirely covered by the decurrent tubes; **pilei** fleshy when fresh, rigid when dry, circular, 1-4 cm. broad, 0.2-0.5 cm. thick; surface whitish to smoky brown, fibrillose to glabrous, azonate; margin thin, acute, fertile below; **context** white, fleshy to fleshy-tough, rather brittle when dry, usually not more than 1 mm. thick, the hyphae often branched, mostly thin-walled, irregular, 4-8 μ in diameter; **tubes** decurrent, white, brownish when dry, less than 2 mm. long, mouths concolorous, angular, averaging 2-4 per mm., the edges thin, entire to somewhat dentate; cystidia not observed; basidia 5.5-6.5 μ in diameter; **spores** hyaline, smooth, apiculate, cylindrical, 7-10 × 2.5-4 μ.

About the bases of stumps or trees. Rather rare. Summer and early fall.

Illustrations: Atkinson, Mushrooms, ed. 3, p. 189, *f. 183.* 1911; Güssow and Odell, Mushrooms and Toadstools, p. 201, *pl. 102.* 1927; Hard, Mushrooms, p. 389, *pl. 44, f. 320.* 1908; Lloyd, Photographs, *Issue No. 25.* 1898, and in Synop. Stip. Polyp., p. 150, *f. 150.* 1912; Overholts, Wash. Univ. Studies 3:86. *pl. 2, f. 7, a-b.* 1915.

24. **Polyporus frondosus** (Dicks.) Fries

Grifola frondosa (Dicks.) S. F. Gray

Stem branching repeatedly and terminating in many overlapping, laterally attached, stipitate or substipitate pilei, forming a more or less globose fruiting body up to 50 cm. in diameter, the branches white or whitish, expanding into the pilei; **pilei** fleshy-tough when fresh, rigid when dry, flabelliform or spathulate, 2-7 cm. broad, 0.2-0.5 cm. thick; surface grayish to drab, glabrous to minutely tomentose, azonate; margin thin, acute, fertile below;

context white, fleshy-tough when fresh, firm and fragile when dry, not over 2 mm. thick, the hyphae rarely to moderately branched, thin-walled, often collapsing, 3-10 μ in diameter; **tubes** decurrent, white, 2-3 mm. long, mouths white or whitish, or darkening on drying, angular, variable in size, averaging 1-3 per mm., the edges becoming thin, dentate; cystidia none; basidia 5-5.5 μ in diameter; **spores** hyaline, smooth, apiculate, ellipsoid to ovoid, 5-6.5 × 3.5-4.5 μ.

About the base of trees or stumps, recorded about chestnut oak and oak unclassified. Occasional. Fall.

Illustrations: Atkinson, Mushrooms, ed. 3, p. 188, *pl. 67, f. 181,* and p. 189, *pl. 68, f. 182.* 1911; Hard, Mushrooms, p. 391, *f. 321.* 1908; Krieger, Nat. Geogr. Mag. 37:408. 1920; Long, Jour. Agr. Research 1:128, *pl. 8, f. 4.* 1913; McIlvaine, Amer. Fungi, p. 482, *pl. 128.* 1912; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:180. *pl. 12, f. 43.* 1914.

Type of rot: straw-colored rot of oaks, see Cartwright, Forestry 14:38-41. 1940, and Long, Jour. Agr. Research 1:125-127. 1913.

25. **Polyporus giganteus** (Pers.) Fries

Grifola gigantea (Pers.) Murr.; *G. mesenterica* (Schaeff.) Murr.; *G. sumstinei* Murr.

Stem short and thick, giving rise to a few broad **pilei** which are fleshy-tough, dimidiate to flabelliform or spathulate, 6-15 cm. in diameter, less than 0.5 cm. thick; surface grayish to brownish, often black when dried, minutely tomentose or fibrillose to almost glabrous, azonate to subzonate; margin very thin, acute; **context** white, fibrous-tough, 1-3 mm. thick, the hyphae rarely branched, thin-walled, 5-8 μ in diameter; **tubes** white, 1-3 mm. long, mouths white, blackish where bruised and on drying, angular or irregular, averaging 5-7 per mm., the edges thin, entire, becoming lacerate; cystidia none; basidia 8 μ in diameter; **spores** hyaline, smooth, often one-guttulate, subglobose to globose, 4-6 μ.

On the ground about stumps. Occasional. Summer and fall.

26. **Polyporus berkeleyi** Fries

P. anax Berk.; *P. beatiei* Bann.; *Grifola berkeleyi* (Fries) Murr.

Stem "sometimes, at least, arising from an underground sclerotium or tuber" (Overholts), the part above ground whitish to brownish, short and thick, 3-9 cm. long, 2-5 cm. thick, more or less tuberculate, unbranched or branched, giving rise to 1-5 broad **pilei** which are fleshy-tough when fresh, rigid when dry, more or less circular, 5-25 cm. broad, 0.4-2.5 cm. thick; surface whitish to yellowish, often brownish when dry, glabrous to slightly tomentose or short hispid, sometimes obscurely zoned; margin rather thin, fertile below; **context** white, or brownish in dry specimens, fleshy-tough when fresh, firm and fragile to subcorky when dry,

0.3-2 cm. thick, the hyphae rarely branched, mostly thick-walled, 3-5 μ in diameter; **tubes** decurrent, white or whitish, 2-8 mm. long, mouths white, whitish, or slightly brownish in dried specimens, angular, irregular, 0.5-2 mm. broad, the edges becoming thin, dentate; cystidia none; basidia 8-11 μ in diameter; **spores** hyaline, echinulate, subglobose to globose or frequently broadly pyriform with a distinct apiculus, 5.5-8 μ.

Around trees and stumps, recorded only about oak. Uncommon. Summer and fall.

Illustrations: Boyce, Forest Pathology, p. 438. 1938; Hard, Mushrooms, p. 393, *f. 323* and p. 394, *pl. 15.* 1908; Lloyd, Photographs, *Issue No. 23-24.* 1898, also Polyp. Issue 3:37. *f. 362*, and p. 39, *f. 363.* 1910; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:180. *pl. 12, f. 41.* 1914 (as *P. anax*); Overholts, Wash. Univ. Studies 3:86. *pl. 2, f. 6.* 1915; Weir, Phytopathology 3:104. *pl. 9.* 1913.

Type of rot: string and ray rot of oaks, see Long, Jour. Agr. Research 1:122-125. 1913; and Weir, Phytopathology 3:101-103. 1913.

27. **Polyporus sulphureus** (Bull.) Fries

P. sulphureus semialbinus Peck; *Laetiporus sulphureus* (Bull.) Murr.; *L. speciosus* (Batt.) Murr.

Pilei narrowed at the base and appearing more or less substipitate, fleshy and watery to rather firm, rigid when dry, imbricate, dimidiate to flabelliform, 5-15 $\times$ 5-20 $\times$ 0.5-2.5 cm.; surface sulphur-yellow to bright orange, often fading with age and becoming brownish or almost white, nearly glabrous, azonate or with broad colored zones; margin thin and acute or thick and obtuse, fertile below; **context** white to light yellow, fleshy when fresh, firm and fragile when dry, 0.4-2 cm. thick, the hyphae intricately branched, thin-walled, irregular, 5-13 μ in diameter; **tubes** bright sulphur-yellow, rarely white, or fading with age, 1-4 mm. long, mouths concolorous, angular, averaging 3-4 per mm., the edges rather thin, minutely fimbriate to entire; cystidia none; basidia 5.5-7 μ in diameter; **spores** hyaline, smooth, ovoid to subglobose, 5-7 $\times$ 4-5 μ.

On the stumps and trunks of deciduous trees, and also rarely upon coniferous substrata. Rather common. Summer and fall.

Illustrations: Atkinson, Cornell Univ. Agr. Exp. Sta. Bull. 193:208, *f. 64*, and p. 209, *f. 65.* 1901, and in Mushrooms, ed. 3, p. 190, *pl. 69, f. 184*, and *pl. 70, f. 185.* 1911; Baxter, Papers Michigan Acad. Sci., Arts, Lett. 14:290. *pl. 47.* (1930) 1931; Cartwright and Findlay (see below), *pl. 4, 5;* Güssow and Odell, Mushrooms and Toadstools, p. 199, *pl. 101, f. 1-3.* 1927; Hard, Mushrooms, p. 397, *f. 326.* 1908; Moffatt, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 13.* 1909; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:180. *pl. 12, f. 40.* 1914.

Type of rot: brown checked rot, see Cartwright and Findlay, Principal Rots of English Oak, pp. 6-10. 1936; Hiley, Fungal Diseases Common Larch, pp. 136-140. 1919; Hubert (**3**, pp. 363-365); Rankin (**16**, pp. 247-250); and von Schrenk and Spaulding (**17**, pp. 37-39).

Subsection 2. Context usually yellowish brown or darker, at least when dry.

Series 1. Spores brown; cystidia or setae absent.

I. Fruiting body pendant.

28. **Polyporus dependens** Berk. and Curt.

Polystictus dependens (Berk. and Curt.) Sacc.; *Coltriciella dependens* (Berk. and Curt.) Murr.

Stem central to excentric, enlarging into the pileus, attached at the vertex, surface reddish brown, 1-4 mm. long, 1-3 mm. thick; **pileus** pendant, coriaceous, conical or expanded, very small, 0.2-2.5 cm. broad, 0.5-1 cm. thick; surface reddish brown, silky-striate, subzonate; margin acute, fibrillose to entire, fertile below; **context** reddish brown, spongy, 0.5-2 mm. thick, the hyphae occasionally to often branched, thin-walled, 4-8 μ in diameter; **tubes** yellowish brown to reddish brown, 5-8 mm. long, mouths concolorous, angular, 1-3 per mm., the edges thin, entire or toothed; cystidia or setae not observed; basidia not observed; **spores** reddish brown, smooth, ellipsoid, 7-10 $\times$ 3.5-5 μ.

On bark and wood of deciduous and coniferous trees, recorded only on pitch pine. Collected at Cutchogue, Long Island, by Roy Latham. This species can be placed in the genus Trametes with equal propriety, as has been done by Baxter (*Papers Michigan Acad. Sci., Arts, Lett.* 14:267. [1930] 1931).

Illustrations: Baxter, Papers Michigan Acad. Sci., Arts, Lett. 14:290. *pl. 35.* (1930) 1931 (as Trametes); Lloyd, Polyp. Issue 1:13. *f. 207.* 1908 (as Polystictus).

II. Fruiting body upright.

29. **Polyporus perennis** (L.) Fries

P. simillimus Peck; *Polystictus perennis* (L.) Karst.; *Coltricia perennis* (L.) Murr.

Stem central, brown, velvety, 1-4 cm. long, 0.2-0.6 cm. thick; **pilei** sometimes confluent, thin, coriaceous, circular, convex to depressed or umbilicate, 1-7 cm. broad, 0.1-0.35 cm. thick; surface dull to subshiny, grayish brown to cinnamon or rusty brown, finely tomentose, substriate, zonate; margin thin and acute, entire or sometimes fimbriate, fertile or occasionally sterile below; **context** reddish brown, less than 1 mm. thick, the hyphae rarely branched, thin-walled, 4-6 μ in diameter; **tubes** adnate to decur-

rent, grayish within, 1-3 mm. long, mouths grayish to cinnamon, angular, averaging 2-4 per mm., the edges thin, finely dentate; setae or cystidia none; basidia 7-9 μ in diameter; **spores** tinged yellowish brown under the microscope, smooth, cylindric-ellipsoid, 6.5-8 $\times$ 4-5 μ.

On earth, especially burned over soil. Rather common. Summer and fall.

Illustrations: Atkinson, Mushrooms, ed. 3, p. 192, *f. 187.* 1911 (as Polystictus); Hard, Mushrooms, p. 416, *pl. 47, f. 346.* 1908; Lloyd, Polyp. Issue 1:9, *f. 201.* 1908 (as Polystictus) and in Mycol. Notes 62: *pl. 141, f. 1608-1609.* 1920 (as Polystictus); Overholts, Wash. Univ. Studies 3:90. *pl. 4, f. 19, a-d.* 1915; Shope, Ann. Missouri Bot. Gard. 18:430. *pl. 26, f. 3.* 1931.

30. **Polyporus cinnamomeus** (Jacq.) Fries

P. splendens Peck; *P. subsericeus* Peck; *Polystictus cinnamomeus* (Jacq.) Sacc.; *Coltricia cinnamomea* (Jacq.) Murr.

Stem central, unbranched or rarely several fused together, reddish brown, velvety to villous, 1-4 cm. long, 0.2-0.5 cm. thick; **pilei** coriaceous, circular, convex to depressed or umbilicate, sometimes confluent, 1-5 cm. broad, 0.1-0.3 cm. thick; surface bright reddish cinnamon to yellowish brown, usually shiny silky-fibrillose, fibers sometimes erect in the center, striate; margin thin, acute, entire or sometimes fimbriate, fertile or occasionally sterile below; **context** rusty brown, less than 1 mm. thick, the hyphae rarely or much branched, thin-walled, 3-12 μ in diameter; **tubes** adnate to slightly decurrent, more or less concolorous with the context, not over 2 mm. long, mouths reddish cinnamon, angular, averaging 2-4 per mm., the edges thin, finely dentate; cystidia or setae none; basidia 7-8 μ in diameter; **spores** tinged yellowish brown under the microscope, smooth, laterally apiculate, cylindric-ellipsoid, 6-8 $\times$ 4-5 μ.

On soil. Frequent. Summer and early fall.

Illustrations: Lloyd, Polyp. Issue 1:7. *f. 200.* 1908 (as Polystictus); Shope, Ann. Missouri Bot. Gard. 18:426. *pl. 24. f. 3.* 1931.

31. **Polyporus focicola** Berk. and Curt.

P. parvulus Klotsch of most American determinations; *P. parvulus* var. *deformatis* Peck; *Coltricia focicola* (Berk. and Curt.) Murr.

Stem central, brown, minutely velvety, 1-3 cm. long, 0.2-0.5 cm. thick; **pileus** coriaceous, circular, convex to depressed or umbilicate, 2-4 cm. broad, 0.1-0.6 cm. thick; surface dull grayish brown to cinnamon, rarely rusty red or tawny, finely tomentose, striate, zonate; margin thin, acute, sterile or fertile below; **context** cinnamon brown to reddish brown, fibrous, 0.5 mm. or less thick, the hyphae rarely to frequently branched, thin-walled, 3-8 μ in diameter; **tubes** brown, 1-6 mm. long, mouths concolorous, angular, averaging 1 mm. or more broad, sometimes smaller, the edges

becoming thin, finely dentate; cystidia or setae none; basidia 8 μ in diameter; **spores** pale yellowish brown under the microscope, smooth, minutely laterally apiculate, cylindric-ellipsoid, 8-10 $\times$ 3.5-4.5 μ.

On earth, especially burnt-over soil. Occasional. Summer and fall.

Illustrations: Lloyd, Polyp. Issue 1:10. *f. 203-204.* 1908 (as Polystictus).

32. **Polyporus montagnei** Fries

Polystictus obesus Ell. and Everh.; *Coltricia obesa* (Ell. and Everh.) Murr.; *C. montagnei* (Fries) Murr.

Stem central to subcentral, brown, soft and tomentose, 2-5 cm. long, 0.5-2 cm. thick; **pileus** soft and spongy when fresh, rigid when dry, convex, 4-10 cm. broad, 0.2-0.7 cm. thick; surface yellowish cinnamon to rusty brown, tomentose or fibrillose especially toward the margin, sometimes with short coarse erect proliferations at the center, usually faintly zonate; margin becoming thin, acute, usually sterile below; **context** yellowish brown to reddish brown, soft and friable when dry, 1-5 mm. thick, the hyphae rarely to somewhat branched, thin-walled, 5-12 μ in diameter; **tubes** decurrent, whitened within, 1-5 mm. long, mouths white or light tan to dark brown, at first circular, soon angular to daedaloid, averaging 0.5-1.5 mm. broad, the edges at first thick, soon becoming thin, entire; cystidia or setae none; basidia 5.5-9.5 μ broad; **spores** pale brown, smooth, cylindric-ellipsoid to broadly ellipsoid, 7-11.5 $\times$ 4-7 μ.

On the ground attached to buried wood, or on old stumps of coniferous trees. Rare. Summer and fall.

Illustrations: Lloyd, Polyp. Issue No. 1, p. 11, *f. 205.* 1908 (as *Polystictus cuticularis*, see correction in note 195, Lloyd Letter 53:15. 1914).

Series 2. Spores hyaline; cystidia or setae present.

33. **Polyporus schweinitzii** Fries

P. hispidoides Peck; *Phaeolus sistotremoides* (Alb. and Schw.) Murr.

Stem central, excentric, lateral, or wanting, surface yellowish to brown, tomentose to nearly glabrous, up to 6 cm. long, 1-4 cm. thick; **pileus** spongy or soft-corky when fresh, fragile when dry, convex to umbonate or infundibuliform, dimidiate or reniform to circular, 5-25 cm. broad, 0.3-1.5 cm. thick; surface ochraceous to orange or yellowish brown to rusty brown, strigose-tomentose to nearly glabrous, azonate to zonate; margin concolorous or lighter, often finely velvety-tomentose, sterile below; **context** yellowish to reddish brown, soft and spongy when fresh, drying firm and fragile, 0.2-1 cm. thick, the hyphae often branched, thin-walled, 6-12 μ in diameter; **tubes** decurrent, orange-yellow when young, with age becoming concolorous with the upper surface, 1-6 mm.

long, mouths more or less concolorous, darker where bruised, circular to angular, soon becoming irregular, averaging 1-3 per mm., the edges rather thin, dentate with age, occasionally breaking down and resulting in extra large pores; **cystidia** hyaline to brown, usually club-shaped, up to 12 μ in diameter, projecting up to 60 μ; basidia 6-8 μ in diameter; **spores** hyaline, smooth, ellipsoid to ovoid, 6-8 $\times$ 4-5 μ.

On or about the stumps or trunks of coniferous trees. Common. Summer and fall.

Illustrations: Boyce, U. S. Dept. Agr. Bull. 1163, *pl. 5, f. 1.* 1923; Hiley as below, *fig. 46, 47;* Lloyd, Polyp. Issue 1:14, *f. 208.* 1908; Meinecke, Manual Forest Tree Dis. *pl. 13.* 1914; Shope, Ann. Missouri Bot. Gard. 18:428. *pl. 25. f. 1-2.* 1931; Weir, Bull. Vocational Educat. (Idaho) 5, No. 5, p. 37, *f. 5.* 1922.

Type of rot: red-brown butt and root rot of conifers, see Boyce (**2**, pp. 465-468); Cartwright and Finlay, Principal Decays Softwoods Used in Great Britain, pp. 32-35. 1938; Hiley, Fungal Diseases Common Larch, pp. 126-134. 1919; Hubert (3, pp. 355-363); Jørstad and Juul, Medd. Skogforsøksv. 22:300-496. 1938; Rankin (**16**, pp. 294-296); seedling and plantation disease, see Baxter, Univ. Michigan School Forestry and Conserv. Circ. 1. 1937; York *et al.*, Science 84:160-161. 1936; and Wean, Phytopathology 27:1124-1142. 1937.

34. **Polyporus circinatus** Fries

P. circinatus var. *proliferus* Peck; *P. tomentosus* Fries sense most American writers; *Coltricia tomentosa* (Fries) Murr.

Stem central or excentric, rarely lateral, sometimes very short, surface ochraceous to brown, tomentose, up to 4 cm. long, 0.5-2 cm. thick; **pilei** sometimes proliferating from the surface of other pilei, each pileus subcoriaceous when fresh, rather rigid when dry, circular to flabelliform, plane to depressed at the center, 3-10 cm. broad, 0.3-2 cm. thick; surface whitish when young, soon becoming ochraceous to yellowish brown or darker, tomentose or soft velvety, azonate to indistinctly zonate; margin acute, usually sterile below; **context** ochraceous to yellowish brown, turning bright brownish red in KOH solution, duplex, soft and spongy above, firm next the tubes, 1-15 mm. thick, the hyphae similar in both tissues, sparingly branched, thin-walled, 4-7 μ in diameter; **tubes** short decurrent, light brown, usually whitish within, 1-4 mm. long, mouths grayish or brown, circular to angular, averaging 2-4 per mm., the edges moderately thick, usually entire; **setae** normally abundant, usually straight, projecting up to 60 μ, 8-12 μ in diameter; basidia 4-5.5 μ in diameter; **spores** hyaline, smooth, slightly apiculate, ellipsoid to cylindric-ellipsoid, 4.5-5.5 $\times$ 3-4 μ.

On the ground attached to buried wood, recorded about stumps of coniferous trees. Frequent. Summer and fall.

In a recent paper Haddow (*Trans. Brit. Mycol. Soc.* 25: 179-190. 1941) states that the species described above is *P. tomentosus* of

Fries, and that *P. circinatus* of Fries is the same plant as *P. dualis* Peck. He prefers to reduce the latter Friesian species to varietal rank, as the curved setae are the only reliable characters to separate it from the type species. The writer has not seen enough European material to have an opinion.

Illustrations: Hubert, Outl. For. Path. p. 352, *f. 92 A.* 1931; Lloyd, Polyp. Issue 1, p. 5, *f. 198.* 1908 (as Polystictus); Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:182. *pl. 13, f. 49, a-b.* 1914; Shope, Ann. Missouri Bot. Gard. 18:430. *pl. 26, f. 1-2.* 1931.

Type of rot: white pocket rot of the roots and butt sections of conifers, see Hubert, Phytopathology 19:745-747. 1929, or in (**3**, pp. 351-355).

35. **Polyporus dualis** Peck

P. circinatus var. *dualis* Peck

Pileus sessile or laterally substipitate with a short rudimentary stem, rigid, flabelliform, or dimidiate, solitary or caespitose-imbricate, 2.5-6 × 3-9 × 0.5-1.2 cm.; surface yellowish brown to reddish brown, soft, velutinate, azonate or nearly so; margin thin to thick, acute to obtuse, sterile below; **context** yellowish brown, duplex, firm-fibrous next the tubes, soft and spongy above, the two parts of about equal thickness, the whole 2-8 mm. thick, the hyphae from next the tubes rarely branched, thin-walled, 4-5.5 μ in diameter; **tubes** brown, slightly whitened within, 2-5 mm. long, mouths concolorous, rather irregular, often uniting radially near the margin giving a somewhat lamellate appearance, averaging 1-3 per mm., sometimes the mouths larger, up to 1.5 mm. broad, the edges thin, entire; **setae** abundant, strongly curved, 10-17 μ in diameter, projecting up to 70 μ; basidia not observed; **spores** hyaline, smooth, ellipsoid to ovoid, 6-7 × 4-5.5 μ.

On the wood of coniferous trees. Rare. The species is usually placed in synonymy with *P. circinatus* but it seems distinct with its peculiarly curved setae, its sessile to subsessile habit of growth, and its larger spores. According to Lloyd (**5**, p. 161) it is the same as *P. leporinus* Fries of Europe. In the one European specimen examined the same peculiar setae were present. The published spore measurements of the European species appear to agree with the measurements here given. Also see the note on Haddow's paper in the preceding description.

Illustration: Lloyd, Polyp. Issue 1:6. *f. 199.* 1908 (as Polystictus).

Section II. Fruiting body sessile or effused-reflexed, rarely resupinate or substipitate (except laterally stipitate 57. P. rhipidium).

Subsection 1. Context light brown to dark brown; spores hyaline or colored.

Series 1. Spores colored, greenish yellow or brownish.

36. **Polyporus hispidus** (Bull.) Fries

Inonotus hirsutus (Scop.) Murr.

Pileus sessile, soft and watery when fresh, firm to rigid when dry, sometimes imbricate, dimidiate, 5-20 × 10-25 × 2-5 cm.; surface yellowish brown to rusty brown, densely hirsute to hispid-tomentose, azonate; margin thick to thin, obtuse to acute, fertile below; **context** usually light yellowish brown above and dark reddish brown next the tubes, or concolorous throughout, fibrous when fresh, firm and fragile when dry, 1-4 cm. thick, the hyphae rarely to somewhat branched, thin- to moderately thick-walled, 6-10 μ in diameter, of two kinds: some very dark and usually thick-walled, others lighter colored, thin-walled; **tubes** yellowish brown or darker, 0.5-1.5 cm. long, mouths yellowish brown, becoming darker where bruised and on drying, angular, averaging 2-4 per mm., the edges thin, entire; cystidia rarely present; basidia 9-11 μ in diameter; **spores** yellowish brown, smooth, one-guttulate, ellipsoid to broadly ovoid, 7-9.5 × 6-8 μ.

On living trunks of deciduous trees. Occasional. Fall.

Illustrations: Baxter, Papers Michigan Acad. Sci., Arts, Lett. 3:50. *pl. 8.* (1923) 1924 (upside down?).

Type of rot: heartrot of ash, see Baxter, Papers Michigan Acad. Sci. Arts, Lett. 3:39-50. 1924, and in Amer. Jour. Bot. 12:522-576. 1925 (biology); Graves, Mycologia 11:119, 120. 1919; Nutman, Ann. Appl. Biol. 16:40-64. 1929; canker of oaks, Sleeth and Bidwell, Jour. Forestry 35:778-785. 1937.

37. **Polyporus glomeratus** Peck

Inonotus glomeratus (Peck) Murr.; *I. radiatus* (Sow.) Karst. of No. Amer. Flora 9:90. 1908 in part.

Pileus sessile or more often effused-reflexed, sometimes resupinate, corky to rigid, usually laterally united, 2-4 × 2-10 × 0.4-2 cm.; surface dark yellowish brown but often greenish yellow from the spores, minutely velvety, becoming glabrous, at length covered with a distinct hard crust, rough and more or less uneven, azonate; margin acute to obtuse, narrowly sterile below; **context** yellowish brown, spongy when fresh, firm and fragile to subwoody when dry, 0.3-1 cm. thick, the hyphae usually rarely branched, thin- to moderately thick-walled, 3-5 μ in diameter; **tubes** sometimes in two layers, brown or olivaceous brown within, 3-9 mm. long, mouths gray, brown, or greenish yellow, angular, 4-6 per mm., the edges thin, entire; context and trama with elongated, pointed setae-like bodies 8-21 μ in diameter; **setae** present or absent, sometimes abundant, subulate, 4.5-6 μ in diameter, projecting up to 16 μ; basidia 5.5-6 μ in diameter; **spores** greenish yellow in mass, yellowish under the microscope, smooth, subglobose to globose, 5-6 × 4.5-5 μ.

On the wood of deciduous trees. Frequent. Sometimes perennial.

A full account of the structure of the fruiting body is given by Overholts in *Torreya* 17:202-206. 1917.

Illustrations: Campbell and Davidson, p. 608 (see below); Overholts, Torreya 17:204. *pl. 1, f. 1.* 1917.

Type of rot: rot of hardwoods, see D. V. Baxter, Papers Michigan Acad. Sci., Arts, Lett. 9:39, 40. (1928) 1929; canker on hardwoods, Campbell and Davidson, Mycologia 31:161-168, 606-611. 1939.

38. **Polyporus cuticularis** (Bull.) Fries

Inonotus cuticularis (Bull.) Karst.; *I. perplexus* (Peck) Murr. in No. Amer. Flora 9:88. 1908 in part.

Pileus sessile, spongy and fleshy-tough when fresh, often imbricate, dimidiate to flabelliform, 3-7 × 3-10 × 0.3-1 cm.; surface yellowish brown to rusty brown, compactly woolly-tomentose or becoming fibrillose, when old varying to almost glabrous, at least in part, zoned when young, usually becoming azonate; margin thin, acute, fertile below; **context** yellowish brown to rusty brown, tough and watery when fresh, distinctly fibrous, fibrous-fragile when dry, 2-7 mm. thick, the hyphae frequently branched, thin-walled, 6-10 μ in diameter; **tubes** brown, 2-7 mm. long, mouths grayish brown to rusty brown, angular, averaging 3-5 per mm., the edges thin, entire to fimbriate or lacerate; **setae** abundant to scarce, sharp-pointed, 5-9 μ in diameter; basidia 6-8 μ in diameter; **spores** yellowish brown, smooth, short-cylindric or broadly ellipsoid to subglobose, 5.5-7.5 × 4-5.5 μ.

On the wood of deciduous trees. Rather common. Summer and fall.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 360, *f. 693*, p. 361, *f. 694.* 1915; Overholts, Wash. Univ. Studies 3:92, *pl. 5, f. 26.* 1915.

39. **Polyporus rheades** (Pers.) Fries

P. corruscans Fries; *P. dryophilus* Berk.; *Inonotus dryophilus* (Berk.) Murr.

Pileus sessile, somewhat fleshy when young, firm when mature, ungulate to subglobose, or tubercular, imbricate or solitary, 3-10 × 5-20 × 3-10 cm.; surface grayish brown to reddish brown, fibrillose, then scabrous, finally almost glabrous, zonate to azonate; margin thick, usually obtuse, sterile below; **context** light yellowish brown to dark reddish brown, outer layer zonate, soft when fresh, hard and fibrous when dry, 0.2-1.5 cm. thick, inner portion a more or less globose granular core 3-10 cm. thick, permeated with white mycelial strands, the hyphae of the outer context rarely branched, thin to rather thick-walled, 5-8 μ in diameter; **tubes** usually concolorous with the context, 0.3-3 cm. long, mouths cinnamon brown, circular to angular, averaging 2-3 per mm., the edges thin, becoming slightly lacerate; **setae** "when present dark

brown, sharp pointed, projecting 10-20 μ" (Overholts); basidia 5-8 μ in diameter; **spores** brown, smooth, ellipsoid to subglobose, 5-8 $\times$ 4-6 μ.

On living (rarely dead) trees, recorded only on white oak. Rare. Summer and fall. Dr. Overholts writes that this plant fruits on the trunks of trees well above the ground-line.

Illustrations: Hedgcock and Long, Jour. Agr. Research 1:250. *f. 1-3, 7* (upside down), *8.* 1913 (as *P. dryophilus*), and in vol. 3:78. *pl. 9, 10.* 1914 (as *P. dryophilus*); Lloyd, Mycol. Notes 35:467. *f. 333.* 1910, also in Synop. Apus Polyporus, p. 362, *f. 696.* 1915, and in Mycol. Notes 53:755. *f. 1129.* 1918; Shope, Ann. Missouri Bot. Gard. 18:420. *pl. 21, f. 5-6.* 1931.

Type of rot: heartrot of oaks and poplars, see Bailey, Bull. Torrey Bot. Club 68:198-201. 1941; Hedgcock and Long, Jour. Agr. Research 3:65-78. 1914; and Hedgcock, Phytopathology 2:73-74. 1912.

Series 2. Spores hyaline or nearly so.

I. Setae present (compare also 35. P. dualis).

40. **Polyporus dryadeus** (Pers.) Fries

Inonotus dryadeus (Fries) Murr.

Pileus sessile, spongy and watery when fresh, more or less corky or woody when dry, dimidiate, applanate, 6-30 $\times$ 8-35 $\times$ 2-6 cm.; surface grayish brown or darker, glabrous, azonate; margin thick and obtuse, "distilling drops of water when young" (Overholts), usually narrowly sterile below; **context** dark brown or rusty brown, soft and watery when fresh, corky to woody on drying, subshiny and faintly zonate when dry, 1.5-4 cm. thick, the hyphae mostly rarely branched, thin- to rather thick-walled, 5-11 μ in diameter mixed with some much branched hyphae 2-5 μ in diameter; **tubes** slightly lighter colored than the context, 0.3-2 cm. long, mouths grayish brown or darker, circular, becoming angular, averaging 3-5 per mm., the edges thin, entire to fimbriate or lacerate; **setae** abundant to rare, usually curved, 6-12 μ in diameter, projecting up to 30 μ; basidia 9-11 μ in diameter; **spores** hyaline or nearly so, smooth, apiculate, ovoid to subglobose, 7-8 $\times$ 5.5-7 μ.

On living trunks, usually of oak. Rare. Late summer and fall. Dr. Overholts supplies the information (letter) that this plant fruits at the ground line.

Illustrations: Cartwright and Findlay as below, *pl. 6b;* Long, Jour. Agr. Research 1:250. *pl. 21, f. 4* and *pl. 22, f. 4.* 1913; Lloyd, Mycol. Notes 36:491. *f. 383.* 1910; Rankin, Man. Tree Diseases, p. 262, *f. 51.* 1923.

Type of rot: root and butt rot of oak, see Boyce (**2**, pp. 118, 119); Cartwright and Findlay, Principal Rots English Oak, pp. 13-15. 1936; Long, Jour. Agr. Research 1:239-250. 1913, Phytopathology 3:285-287. 1913, and vol. 20:758, 759. 1930.

41. Polyporus gilvus (Schw.) Fries

Hapalopilus gilvus (Schw.) Murr.

Pileus sessile or effused-reflexed, sometimes resupinate, leathery to corky or rigid, often imbricate, dimidiate, 1-8 × 3-15 × 0.2-2.5 cm.; surface yellowish brown to reddish brown, somewhat pubescent when young, glabrous when mature, usually rough, sometimes scrupose; margin acute, narrowly sterile below; **context** yellowish brown, soft-corky when fresh, woody when dry, faintly zonate, 0.1-2.5 cm. thick, the hyphae rarely branched, medium thick- to thick-walled, 3-7 μ in diameter; **tubes** brown, sometimes stratified, 1-12 mm. long, mouths reddish brown to dark brown, circular to angular, averaging 5-8 per mm., the edges rather thick, entire; **setae** abundant, subulate, projecting 10-16 μ, 4-7 μ in diameter; basidia 4.5-5.5 μ in diameter; **spores** hyaline, smooth, cylindric-ellipsoid, 4-6 × 3-4 μ.

On the wood of deciduous or rarely of coniferous trees. Common. Summer and fall.

Illustrations: Hirt, N.Y.S. Coll. Forestry Tech. Publ. 22: *pl. 1, f. 1-2.* 1928; Moffatt, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 15, f. 2.* 1909; Overholts, Wash. Univ. Studies 3:92. *pl. 5, f. 25.* 1915.

Type of rot: white rot of the sapwood and heartwood of deciduous trees, see Hirt, N.Y.S. Coll. Forestry Tech. Publ. 22. 1928 (biology).

42. Polyporus radiatus (Sow.) Fries

P. aureonitens Pat. and Peck; *Inonotus radiatus* (Sow.) Karst. of No. Amer. Flora 9:90. 1908 in part.

Pileus sessile, rather firm and rigid, dimidiate or flabelliform and attached by a narrowed base, 2-5 × 2-7 × 0.3-1.5 cm.; surface yellowish brown to rusty brown, velvety to glabrous, usually zonate, sometimes azonate; margin thin to thick, acute, fertile below; **context** yellowish brown to rusty brown, corky to subwoody, fibrous, zonate, 2-10 mm. thick, the hyphae rarely to moderately branched, thin- to rather thick-walled, 3-7 μ in diameter; **tubes** brownish to rusty brown, 1-8 mm. long, mouths grayish brown to rusty brown, circular, becoming angular, averaging 4-5 per mm., the edges rather thin, entire; **setae** usually rare, ventricose, straight to curved, 4-10 μ in diameter, projecting 5-10 μ; basidia 5-6.5 μ in diameter; **spores** hyaline, smooth, cylindric-ellipsoid to ellipsoid, 4-5 × 3-4 μ.

On the wood of deciduous trees, usually on alder or birch. Common. Summer and fall.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 351, *f. 688.* 1915.

II. Setae absent (compare also 68. P. planellus and 77. P. robiniophilus).

43. **Polyporus rutilans** (Pers.) Fries

P. nidulans Fries; *Hapalopilus rutilans* (Pers.) Murr.

Pileus sessile or effused-reflexed, soft and spongy when fresh, firm and fragile when dry, dimidiate, 2-5 × 2-8 × 0.5-2 cm.; surface cinnamon to yellowish brown or dark brown, velvety or fibrillose to glabrous, azonate; margin purplish or reddish where bruised, thin and acute, fertile below; **context** concolorous with the pileus, soft and watery when fresh, soft and friable when dry, turning violaceous, then colorless, when touched with KOH solution, 2-15 mm. thick, the hyphae rarely to frequently branched, thick-walled, 4-6 μ in diameter; **tubes** concolorous, whitish incrusted within, 2-7 mm. long, mouths grayish to yellowish brown or reddish brown, angular or sinuous, averaging 3-4 per mm., the edges thin, entire; cystidia or setae none; basidia 4-5 μ in diameter; **spores** hyaline, smooth, ellipsoid to ovoid, 2.5-4 × 2.5-3 μ.

On the wood of deciduous trees, especially oak and hickory. Common. Summer and fall. The reaction with KOH is distinctive.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 335, *f. 674*. 1915.

44. **Polyporus resinosus** (Schrad.) Fries

P. benzoinus (Wahl.) Fries; *P. fuscus* (Pers.); *Ischnoderma fuliginosa* (Scop.) Murr.

Pileus sessile or effused-reflexed, watery and fleshy when young, corky when mature, imbricate or solitary, dimidiate, 5-15 × 5-20 × 0.8-2.5 cm.; surface cinnamon brown to blackish brown, minutely hispid or velvety-tomentose to glabrous, zonate with more or less distinct darker bands; margin usually rather thick, acute to obtuse, fertile below; **context** very light brown, drying firm and fragile, 0.5-2 cm. thick, the hyphae sparingly branched, thin- to thick-walled, 4-6 μ in diameter; **tubes** concolorous with the context, 1-6 mm. long, mouths white to pallid, darker where bruised and on drying, circular to angular, averaging 4-6 per mm., the edges thin, entire to dentate or lacerate; cystidia or setae none; basidia 4-5 μ in diameter; **spores** hyaline, smooth, allantoid, 5-7 × 1-2 μ.

On old logs and stumps of deciduous and coniferous trees. Common. Summer and fall. Lloyd (7, p. 334) considers the form on coniferous hosts (*P. benzoinus*) distinct from the form on deciduous substrata (*P. fuscus*). Snell *et al.* (*Mycologia* 20:279-281, 1928) have shown that the cultural characteristics are quite similar for both. They are here considered to be forms of the same species.

Illustrations: Hard, Mushrooms, p. 403, *f. 331*. 1908; Moffatt, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 15, f. 1*. 1909; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:178. *pl. 11, f. 37*. 1914; Shope, Ann. Missouri Bot. Gard. 18:422. *pl. 22, f. 2*. 1931.

Type of rot: white stringy rot, see Cartwright and Findlay, Principal Decays Softwoods Used in Great Britain, pp. 73-75. 1938.

45. **Polyporus graveolens** (Schw.) Fries

Fomes graveolens (Schw.) Cooke; *Globifomes graveolens* (Schw.) Murr.

Fruiting body a sessile, globose or cylindrical mass 4-20 cm. in diameter, arising from a central, granular, solid core, with numerous overlapping pilei, the **pilei** sessile, conchate, laterally confluent, 0.5-3 cm. long, 0.2-0.6 cm. thick; surface grayish brown to cinnamon brown or grayish black, slightly incrusted, pulverulent or glabrous; margin bent downward and concealing the pores, thin, sterile or fertile below; **context** yellowish brown, floccose-fibrous, 1-4 mm. thick, the hyphae thick-walled, the larger (4-8 μ in diameter) rarely branched, the smaller (2.5-4 μ) occasionally to often branched; **tubes** concolorous, 2-4 mm. long, mouths grayish brown to dark brown, circular, averaging 3-4 per mm., the edges thick, entire; cystidia or setae none but incrusted ends of hyphae sometimes project from the hymenium; basidia not observed; **spores** "cylindric, smooth, hyaline, 9-10 $\times$ 2.5-3.5 μ" (Overholts).

On logs and trunks of deciduous trees, recorded only on living red oak. Rare. Summer. The fruiting body is said to sometimes have a sweet odor when growing and is known as "sweet knot."

Illustrations: Hard, Mushrooms, p. 405, *f. 334.* 1908 (upside down); Graves, Mycologia 11:124. *pl. 10, f. 3.* 1919; Lloyd, Polyp. Issue 3:42, *f. 367* (upside down), and p. 43, *f. 368.* 1910, and in Synop. Stip. Polyp., p. 155. *f. 455.* 1912; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:182. *pl. 13, f. 11, a-b.* 1914; Overholts, Wash. Univ. Studies 3:92. *pl. 5, f. 24.* 1915.

Type of rot: heartrot of oak, see Graves, Mycologia 11:118. 1919.

Subsection 2. Context reddish, orange, pinkish, or yellowish; spores hyaline (compare also 27. P. sulphureus; 102. Trametes subrosea; and 126. Fomes fraxineus).

46. **Polyporus sanguineus** (L.) Fries

Pycnoporus sanguineus (L.) Murr.

Pileus sessile, dimidiate, or attenuate at the base and appearing substipitate, coriaceous, 2-6 $\times$ 2-10 $\times$ 0.2-0.4 cm.; surface bright red, sometimes fading, finely tomentose to glabrous, often indistinctly zonate; margin very thin, narrowly sterile below; **context** red or yellowish red, floccose-fibrous, up to 2.5 mm. thick, the hyphae rarely branched, thick-walled, 3-7 μ in diameter; **tubes** red, 0.5-1.5 mm. long, the mouths cinnabar-red, circular when young, becoming more or less angular, averaging 3-5 per mm., the edges thin, entire; cystidia none; hyphal pegs occasional,

usually columnar, projecting up to 40 μ, up to 60 μ broad; basidia 5 μ in diameter; **spores** hyaline, smooth, cylindrical, 3-5 $\times$ 1.5-2 μ.

On the wood of deciduous trees. Reported by Peck on three occasions but no specimens were found at Albany. Dr. L. O. Overholts has kindly sent me a record of a collection made by Dr. H. D. House, Camp Perry, 1913.

This species differs from *P. cinnabarinus* only in the thickness of the pileus, and Weir (*Mycologia* 11:64. 1919) suggests that the two species may be identical.

47. **Polyporus cinnabarinus** (Jacq.) Fries

Pycnoporus cinnabarinus (Jacq.) Karst.; *Trametes cinnabarina* (Jacq.) Fries

Pileus sessile, more or less corky to rigid, dimidiate to flabelliform, 2-6 $\times$ 2-10 $\times$ 0.5-2 cm.; surface orange to cinnabar-red, often paler with age, tomentose to glabrous, azonate; margin thin, acute, sterile below; **context** red to yellowish red, turning yellowish brown in KOH solution, floccose-fibrous to soft-corky, zonate, 0.4-2 cm. thick, the hyphae sparingly branched, thick-walled or thin-walled, 3-8 μ in diameter; **tubes** concolorous with the context or slightly darker, 1-4 mm. long, mouths cinnabar-red, circular, angular, or daedaloid, averaging 2-4 per mm., the edges thick to rather thin, entire; cystidia none; hyphal pegs occasional, usually somewhat conical, projecting up to 50 μ, up to 50μ broad at the base; basidia 6-7 μ in diameter; **spores** hyaline, smooth, cylindrical, 4-6 $\times$ 2-3 μ.

On the wood of deciduous or rarely of coniferous trees, often on cherry. Common. Summer and fall.

Illustrations: Hard, Mushrooms, p. 409, *f. 338*. 1908; Murrill, Mycologia 10:107. *pl. 6, f. 1*. 1918; Shope, Ann. Missouri Bot. Gard. 18:426. *pl. 24, f. 1*. 1931.

48. **Polyporus fibrillosus** Karst.

P. aurantiacus Peck; *Inonotus fibrillosus* Karst.; *Pycnoporellus fibrillosus* (Karst.) Murr.

Pileus sessile or effused-reflexed, soft and spongy when fresh, firm-fragile when dry, imbricate, dimidiate, 2-5 $\times$ 3-6 $\times$ 0.4-3 cm.; surface orange red to orange brown, fibrous tomentose, sometimes faintly zonate; **context** concolorous with the surface of the pileus or slightly lighter in color, watery-tough when fresh, spongy-fragile to firm-corky when dry, zonate, turning bright orange red in KOH solution, 0.3-2 cm. thick, the hyphae rarely to often branched, usually thick-walled, sometimes thin-walled, 4-10 μ in diameter; **tubes** concolorous with the context, 2-5 mm. long, mouths cream colored to light orange, angular, unequal, 1-2 per mm., the edges rather thin, becoming lacerate; **cystidia** hyaline, cylindrical, 4-5 μ in diameter, projecting up to 60 μ; basidia 4-6 μ

in diameter; **spores** hyaline, smooth, sometimes apiculate, cylindric-ellipsoid, 5-7 × 3-4 μ.

On the wood of coniferous trees. Rather rare. Summer.

Illustrations: Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:178, *pl. 11, f. 35, a-c.* 1914 (as *P. aurantiacus*); Shope, Ann. Missouri Bot. Gard. 18:412. *pl. 17, f. 4-5.* 1931.

49. **Polyporus alboluteus** Ell. and Everh.

Aurantiporellus alboluteus (Ell. and Everh.) Murr.; *Lenzites sepiaria* var. *dentifera* Peck

Pileus effused-reflexed or resupinate, soft and spongy, easily separable, 0-4 × 3-10 × 1.5-4 cm.; surface orange, with age becoming incrusted and turning black, or bleaching to almost white, velvety, azonate; **context** orange to yellowish orange, very soft and spongy, becoming bright red when touched with KOH solution, 0.5-3 cm. thick, the hyphae frequently branched, thin-walled, 4-10 μ in diameter; **tubes** concolorous, 1-3 cm. long, mouths yellowish or orange, sometimes turning black where bruised, angular, 1-3 mm. or more broad, the dissepiments thin, often splitting and becoming tooth-like, or poroid and edges lacerate with age; **cystidia** "abundant, hyaline, cylindric, 7-9 μ in diameter, often collapsed, projecting up to 60 μ" (Shope); basidia not observed; **spores** "cylindric, smooth, hyaline, 8-10 × 2.5-3.5 μ" (Overholts).

On the wood of coniferous trees, recorded only on spruce. Very rare, once collected, Adirondacks, C. H. Peck. Summer. The species is typically western.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 340. *f. 678.* 1915; Shope, Ann. Missouri Bot. Gard. 18:416. *pl. 19, f. 1-4.* 1931.

50. **Polyporus croceus** (Pers.) Fries

P. hypococcinus Berk.; *P. pilotae* Schw.; *Aurantiporus croceus* (Pers.) Murr.; *A. pilotae* (Schw.) Murr.

Pileus sessile, watery and rather soft when fresh, rigid when dry, dimidiate, 5-10 × 5-15 × 1-5 cm.; surface buff to orange when fresh, fading on drying, minutely tomentose to glabrous, azonate; margin usually obtuse, sterile below; **context** pale buff when fresh, sordid flesh color to dark red, hard, fibrous, and strongly zonate when dry, 0.7-3 cm. thick, the hyphae rarely branched, usually thin-walled, incrusted, 3-5 μ in diameter; **tubes** orange, sometimes remaining so but more often becoming brownish to black, resinous, and agglutinated on drying, 0.5-2 cm. long, mouths concolorous, angular, averaging 3-5 per mm., the edges becoming thin, lacerate; cystidia none; basidia not observed; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 4.5-5.5 × 2.5-3 μ.

On the wood of deciduous trees. Very rare. Summer and fall. When dry compare 81. *P. fissilis.*

Illustrations: Long, Jour. Agr. Research 1:128. *pl. 7, f. 1.* 1913 (as *P. pilotae*).

Type of rot: pocketed or piped rot in oak and chestnut, see Long, Jour. Agr. Research 1:114-122. 1913.

Subsection 3. Context white or whitish when fresh, rarely light brown; spores hyaline (except bluish gray in 85. P. caesius).

Series 1. Pore surface surrounded by a volva.

51. Polyporus volvatus Peck

P. volvatus var. *typicus* Peck; *P. volvatus* var. *obvolutus* (Berk. and Cooke) Peck; *Cryptoporus volvatus* (Peck) Shear

Pileus sessile, or very rarely attached by a stem-like base, corky to woody, globose to compressed-globose, 1-5 cm. broad, 1-4 cm thick; upper surface at first resinous, whitish or yellowish or tinged with red, the resinous secretion soon flaking off; margin rounded and continuous with the volva; **volva** at first unbroken, later developing one to a few openings; **context** white or pallid, soft-corky when dry, 2-10 mm. thick, the hyphae rarely branched, thick-walled, 3-7 μ in diameter; **tubes** at first white, darkening with age, narrowed at the mouths, 2-5 mm. long, mouths white when young, darkening to chocolate with age, circular to angular, averaging 3-4 per mm., the edges thick, entire; cystidia very inconspicuous, usually scarcely projecting, blunt or pointed, 5-7 μ in diameter; basidia "6-8 μ in diameter" (Shope); **spores** hyaline, smooth, cylindric-ellipsoid, 10-13 $\times$ 4.5-5.5 μ.

On the bark and wood of coniferous trees. Uncommon. Spring and summer. Ellipsoid to pyriform conidia are reported for this species by Zeller (*Mycologia* 7:121-125. 1915).

Illustrations: Hard, Mushrooms, p. 411, *f. 340.* 1908; Lloyd, Polyp. Issue 2:25. *f. 261.* 1909, and Issue 3:33, *f. 358.* 1910; and Synop. Apus Polyporus, p. 313, *f. 652.* 1915; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:182, *pl. 13, f. 45, a-d.* 1914; Peck, Rept. N.Y.S. Mus. 27:98. *pl. 2, f. 3-6.* 1875 and in Bull. Torrey Bot. Club 7:104. *f. 1-3.* 1880; Schmitz, Phytopathology 12:495, *f. 1.* 1922; Shope, Ann. Missouri Bot. Gard. 18:410. *pl. 16, f. 1.* 1931; von Schrenk, U. S. Dept. Agr. Div. Veg. Physiol. and Path. Bull. 25: *pl. 1, f. 2.* 1900; Zeller, Mycologia 7:125, *pl. 159, f. 1-2.* 1915.

Type of rot: bark and wood rot of conifers, see Schmitz, Jour. Gen. Physiol. 3:795-800. 1921, Jour. Forestry 21:502-503. 1923, and Phytopathology 12:494-496. 1922; and also Zeller as above.

Series 2. Pore surface never surrounded by a volva, entirely free from the first.

I. Tubes usually of a markedly different color or consistency than the context.

A. Tubes usually more or less smoke colored to almost black, at least when dry.

52. **Polyporus crispus** (Pers.) Fries

Bjerkandera adusta (Willd.) Karst. of No. Amer. Flora 9:40. 1907 in part.

Pileus sessile or effused-reflexed, coriaceous, densely imbricate, 2-7 × 1-5 × 0.2-0.4 cm.; surface grayish to light brown, often cinnamon or light yellowish brown when dry, radially appressed-fibrillose toward the margin, usually strigose at the base, zonate to azonate; margin very thin, crisped or wavy, often becoming black when dry, sterile below; **context** white or pallid, corky, usually separated from the tubes by a narrow dark line, 1-3 mm. thick, the hyphae rarely branched, thin- to medium thick-walled, 4-5 μ in diameter; **tubes** grayish black to black, 1-3 mm. long, mouths concolorous, subcircular to angular, variable in size, averaging 3-6 per mm., the edges medium to rather thick, entire; tramal tissue brown in thin section under the microscope; cystidia none; basidia 4-5 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 3.5-4.5 × 1.5-2.5 μ.

On the wood of deciduous trees. Apparently rare, or perhaps has been confused with *P. adustus* from which it differs only in the character of the upper surface and in the crisped or wavy margin of the pileus. Summer.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 329, *f. 672*. 1915; Overholts, Ann. Missouri Bot. Gard. 2:726. *pl. 23, f. 7*. 1915; Shope, Ann. Missouri Bot. Gard. 18:424. *pl. 23, f. 1*. 1931.

53. **Polyporus adustus** (Willd.) Fries

P. carpineus (Sow.) Fries; *Bjerkandera adusta* (Willd.) Karst. of No. Amer. Flora 9:40. 1907 in part.

Pileus sessile or effused-reflexed, somewhat fleshy to corky, sometimes imbricate, 1-5 × 3-8 × 0.2-0.6 cm.; surface white to tan or grayish, finely tomentose to short villous-tomentose, indistinctly zonate to azonate; margin thin, sterile below, often blackish in dried plants; **context** white to pallid, corky, in thick specimens separated from the tubes by a black line, 1-4 mm. thick, the hyphae rarely branched, thick-walled, 4-6 μ in diameter; **tubes** grayish black to black, 1-2 mm. long, mouths concolorous, circular to angular, averaging 6-8 per mm., the edges thin, entire; tramal tissue brown in thin section under the microscope; cystidia none; basidia 5-6 μ broad; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, rarely slightly curved, 3.5-5 × 1.5-2.5 μ.

On the wood of deciduous or rarely of coniferous trees. Common. Summer and fall.

Illustrations: Murrill, Mycologia 10:107, *pl. 6, f. 1*. 1918; Overholts, Ann. Missouri Bot. Gard. 2:726. *pl. 23, f. 8*. 1915; Shope, Ann. Missouri Bot. Gard. 18:420. *pl. 21, f. 1-4*. 1931.

Type of rot: white mottled or cubical rot, see Brooks, Trans. Brit. Mycol. Soc. 10:225-226. 1925; and Hubert (3, p. 366).

54. Polyporus fumosus (Pers.) Fries

P. fragrans Peck; *Bjerkandera fragrans* (Peck) Murr.; *B. fumosa* (Pers.) Karst.; *B. puberula* (Berk. and Curt.) Murr.

Pileus sessile or effused-reflexed, usually licorice- or anise-scented when fresh, or with a disagreeable odor, leathery to rigid, dimidiate, often imbricate, conchate to subunguliform, 2-10 × 3-15 × 0.5-2 cm., or thicker; surface white to ochraceous or smoky white, rarely darker, finely tomentose to glabrous, azonate to subzonate; margin thick and obtuse to thin and acute, sterile below; **context** white to pallid, corky, zonate, sometimes with dark lines running through it and always separated from the tubes by a narrow dark line, 2-15 mm. thick, the hyphae rarely branched, somewhat thick-walled, 4-6 μ in diameter; **tubes** concolorous with the context or darkening to more or less smoke colored on drying, 1.5-4 mm. long, mouths white to grayish black, usually darkening on drying, sometimes becoming black where bruised, angular and somewhat unequal when mature, averaging 3-4 per mm., the edges moderately thick to thin, entire to dentate, sometimes incised; tramal tissue hyaline or nearly so in thin section under the microscope; cystidia none; basidia 5.5-7.5 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 4.5-6 × 2-3 μ.

On the wood of deciduous trees, especially elm. Rather common. Summer and fall.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 308, *f. 647*, and p. 309, *f. 648* (as *P. holmiensis*). 1915; Overholts, Ann. Missouri Bot. Gard. 2:726. *pl. 23, f. 3.* 1915.

Type of rot: said to be a parasite of trees in Russia, see Rev. Appl. Mycology 5:62, 63. 1926.

B. Tubes whitish to reddish or orange or purplish, more or less waxy when fresh. P. rhipidium laterally stipitate! (Tubes not waxy, compare 27. P. sulphureus; 58. P. abietinus; and 59. P. pargamenus).

55. Polyporus amorphus Fries

Tyromyces amorphus (Fries) Murr.

Pileus sessile or effused-reflexed, sometimes resupinate, coriaceous, 0-2 × 1-4 × 0.2-0.3 cm.; surface white to grayish, villous-pubescent or tomentose, zonate; margin thin, sterile below; **context** white, spongy to firm when dry, 1-2 mm. thick, the hyphae rarely to occasionally branched, thick-walled, 3-5 μ in diameter; **tubes** pinkish to orange or brick-red, somewhat waxy when fresh, appearing resinous when dry, 1-2.5 mm. long, mouths concolorous, angular, very irregular, averaging 2-4 per mm., the edges whitened, thin, entire; hymenophore scarcely if at all distinct from the context; cystidia none; basidia 3-4 μ in diameter; **spores** hyaline, smooth, allantoid, 3.5-5 × 1-2 μ.

On the wood and bark of coniferous trees, or growing over chips and needles of conifers, usually of pine. It resembles small specimens of *P. abietinus*.

Illustrations: Murrill, Mycologia 10:107. *pl. 6, f. 5.* 1918; Overholts, Mycologia 9:270. *pl. 12.* 1917.

Type of rot: stringy rot of the sapwood of pitch pine, see Overholts, Mycologia 9:261-270. 1917.

56. **Polyporus dichrous** Fries

Gloeoporus conchoides Mont. of most early American determinations; *G. dichrous* (Fries) Bres.

Pileus sessile or effused-reflexed, coriaceous, dimidiate, 0.5-3 × 1-6 × 0.1-0.5 cm.; surface white or whitish, velvety to glabrous, azonate; margin thin, acute to obtuse, sterile below; **context** white, soft-fibrous, 1-4 mm. thick, the hyphae somewhat branched, thick-walled, 3.5-4.5 μ in diameter; **tubes** flesh colored to reddish purple or purplish black, less than 1 mm. long, waxy and easily separable from the context in a thin elastic layer when fresh or when moistened, mouths concolorous, circular, averaging 5-7 per mm., the edges thin, entire; hymenophore sharply distinct from the context, the hyphae more or less gelatinized, 1-2 μ in diameter; cystidia none; basidia 3-4 μ in diameter; **spores** hyaline, smooth, allantoid, 3.5-4.5 × 0.5-1 μ.

On the wood of deciduous or rarely of coniferous trees. Common. Summer and fall. The species is characterized by the waxy tubes which are easily separable from the context when fresh. On this account it is often placed in a separate genus, Gloeoporus.

Illustrations: Lloyd, Mycol. Notes 65: *pl. 176, f. 1920.* 1920; Moffatt, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 16, f. 1.* 1909; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull 33:158. *pl. 1, f. 5.* 1914 (as *Gloeoporus conchoides*).

Type of rot: associated with a white rot, see Davidson *et al.*, Jour. Agric. Res. 57:683-695. 1938.

57. **Polyporus rhipidium** Berk.

Favolus rhipidium (Berk.) Sacc.

Stem lateral, equal or enlarging at the base, whitish to reddish pulverulent, 0.5-2 cm. long, 0.1-0.4 cm. thick; **pileus** subfleshy to coriaceous when fresh, rigid when dry, reniform or spathulate, 1-2 cm. broad, 0.1-0.3 cm. thick; surface when young white, minutely squamulose or mealy, azonate, changing to light tan or brick-red on drying; margin thin and acute, fertile below; **context** white, not more than 1 mm. thick, the hyphae occasionally to much branched, thin-walled, rarely thick-walled, irregular, 5-8 μ in diameter; **tubes** whitish when fresh, turning to reddish on drying, 1-2 mm. long, more or less waxy when fresh, rigid when dry, the mouths white to reddish, angular, radially elongated, averaging 2-3 per mm., the edges moderately thick to somewhat thin, entire;

hymenophore not distinct from the context; cystidia none or represented by hyaline, pointed or sometimes apically enlarged hairs 2-3 μ in diameter, sometimes in small groups, projecting up to 20 μ; basidia 3.5-4 μ in diameter; **spores** hyaline, smooth, cylindrical, 3.5-5 $\times$ 2-2.5 μ.

On wood. Very rare, recorded but once, Sterling, C. H. Peck.

Illustrations: Lloyd, Polyp. Issue 2:23. *f. 260, a-e.* 1909, and in Issue 3:33. *f. 357.* 1910; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:158. *pl. 1, f. 7.* 1914 (as Favolus).

II. Tubes more or less of the same color and consistency as the context, at least when fresh.

A. Fruiting body more or less coriaceous when fresh, the context rarely over 5 mm. thick and usually much thinner; spores cylindrical to ellipsoid, or allantoid.

1. Dissepiments usually soon splitting, becoming tooth-like (compare also 69. P. undosus).

58. **Polyporus abietinus** (Dicks.) Fries

P. abietinus var. *irpiciformis* Peck; *Polystictus abietinus* (Dicks.) Sacc. and Cub.; *Coriolus abietinus* (Dicks.) Quél.

Pileus sessile or effused-reflexed, sometimes resupinate, coriaceous, dimidiate, 0.5-5 $\times$ 1-5 $\times$ 0.1-0.3 cm.; surface whitish to grayish, sometimes greenish due to the presence of algae, becoming grayish black at the base, villous, zonate; margin thin, fertile below; **context** pallid to brownish, resinous appearing when dry, not more than 1 mm. thick, the hyphae rarely branched, thick-walled, 3-4 μ in diameter; **tubes** white, brownish, or violaceous, less than 3 mm. long, mouths concolorous, circular to angular, averaging 2-3 per mm. in poroid forms, usually the dissepiments soon splitting to form more or less evident teeth, or sometimes lamellate, the edges thin; **cystidia** abundant, or varying to absent, incrusted or not incrusted at the apex, 3-6 μ in diameter, projecting up to 10 μ; basidia 5-6 μ in diameter; **spores** hyaline, smooth, cylindric-ellipsoid or allantoid, 5-7 $\times$ 2-2.5 μ.

On the wood of coniferous trees. Common. Spring, summer, and fall.

Polyporus amorphus resembles this but is smaller, always has a regularly poroid hymenial surface and smaller spores.

Illustrations: Lloyd, Mycol. Notes 70: *pl. 259, f. 2567.* 1923; Overholts, Ann. Missouri Bot. Gard. 2:726. *pl. 23, f. 1-2.* 1915; Rhoads, N.Y.S. Coll. Forestry Tech. Publ. 11: *pl. 1.* 1918; Shope, Ann. Missouri Bot. Gard. 18:414. *pl. 18, f. 2-6.* 1931; Weir, Bull. Vocational Educat. (Idaho) 5, No. 5, p. 55, *f. 25.* 1922.

Type of rot: pitted sapwood rot of conifers, see Cartwright and Findlay, Principal Decays Softwood Used in Great Britain, pp. 52, 53. 1938; Hubert (3, pp. 325-327); Spaulding, U. S. Dept. Agr. Tech. Bull. 132. 1929.

59. **Polyporus pargamenus** Fries

Polystictus (*pergamenus*) *pargamenus* (Fries) Sacc.; *Coriolus prolificans* (Fries) Murr.

Pileus sessile or effused-reflexed, often narrowed at the base, coriaceous, 1-6 × 1-6 × 0.1-0.5 cm.; surface whitish, yellowish, grayish, or brownish with age, or dark gray behind, villous or velvety tomentose, zonate; margin thin, sterile below; **context** white to brownish, less than 1 mm. thick, the hyphae thick-walled, somewhat branched, 2-6 μ in diameter; **tubes** white to brownish, or violaceous, 1-5 mm. long, mouths concolorous, the dissepiments usually soon breaking up to form teeth, or sometimes concentric lamellae, when poroid mouths averaging 3-4 per mm., the edges thin; **cystidia** abundant to rare, often incrusted at the tips, 4-5 μ in diameter, projecting up to 15 μ; basidia 5-6 μ in diameter; **spores** hyaline, smooth, cylindrical to allantoid, 5-6.5 × 1.5-2.5 μ.

On the wood of deciduous or rarely of coniferous trees. Common. Summer and fall.

Illustrations: Hard, Mushrooms, p. 415, *f. 345*. 1908 (as *Polystictus pergamenus*); Overholts, Ann. Missouri Bot. Gard. 2:726, *pl. 23, f. 9*. 1915; Rhoads in N.Y.S. Coll. Forestry Tech. Publ. 8; *pl. 6*. 1917 (as *Coriolus prolificans*), and in Tech. Publ. 11; *pl. 1-3, 5-6, 19, 30-31*. 1918; Shope, Ann. Missouri Bot. Gard. 18:410, *pl. 16, f. 4*. 1931; von Schrenk and Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull. 149:57, *f. 7*. 1909 (as *Polystictus pergamenus*).

Type of rot: saprot of deciduous trees, see Rhoads, N.Y.S. Coll. Forestry Tech. Publ. 11. 1918 (biology); von Schrenk and Spaulding (**17**, pp. 56-58.)

60. **Polyporus tulipiferus** (Schw.) Overh.

Irpex tulipifera (Schw.) Fries; *Irpiciporus lacteus* (Fries) Murr.; *I. tulipiferae* (Schw.) Murr.

Pileus sessile or effused-reflexed, or resupinate, thin and coriaceous, usually narrowly elongate and confluent, 0-1 × 1-5 × 0.2-0.6 cm.; surface white or whitish, villous, zonate; margin thin, fertile below; **context** white, fibrous, 0.5-2 mm. thick, the hyphae rarely branched, thick- to thin-walled, 4-6 μ in diameter; **tubes** white or whitish, 1-5 mm. long, mouths white to yellowish, usually the dissepiments very soon breaking up to form compressed teeth which remain connected at their bases, often concentrically arranged, when poroid the mouths angular, averaging about 2 per mm., edges thin to moderately thick, soon becoming dentate to incised; **cystidia** scattered, usually incrusted throughout, 4-5.5 μ in diameter, projecting up to 25 μ; basidia 5 μ in diameter; **spores** hyaline, smooth, cylindrical, 5-6 × 2-3 μ.

On the wood of deciduous trees. Common. Summer and fall.

Illustrations: Baxter, Papers Michigan Acad. Sci., Arts, Lett.

14: 290. *pl. 36.* (1930) 1931 (as Irpex); Overholts, Wash. Univ. Studies 3:88. *pl. 3, f. 11, a-c.* 1915.

61. **Polyporus biformis** Klotzsch

Coriolus biformis (Klotzsch) Pat.; *C. molliusculis* (Berk.) Murr.

Pileus sessile or more often effused-reflexed, coriaceous when fresh, rather rigid when dry, often laterally confluent and imbricate, 1-5 × 2-6 × 0.2-1.2 cm.; surface white to light tan, usually rough with radially appressed fibrils, azonate to subzonate; margin thin, fertile below; **context** white, fibrous-tough when fresh, corky when dry, 1-5 mm. thick, the hyphae rarely branched, thick-walled, 3-4 μ in diameter; **tubes** concolorous with the context or slightly darker, 2-7 mm. long, mouths white to yellowish or light brown, the dissepiments usually soon breaking up to form teeth, when poroid mouths circular to angular or daedaloid, averaging 1-2 per mm., the edges thin; cystidia none; basidia 4-6 μ in diameter; **spores** hyaline, smooth, sometimes with a small apiculus, cylindrical to slightly curved, 6-8 × 2-2.5 μ.

On the wood of deciduous trees. Frequent. Summer and fall.

Illustrations: Hard, Mushrooms, p. 412, *f. 341.* 1908; Lloyd, Mycol. Notes 42:580. *f. 817.* 1916 (as Polystictus); Overholts, Wash. Univ. Studies 3:88. *pl. 3, f. 16, a-b.* 1915.

2. Dissepiments not splitting, the edges of the mouths entire to lacerate.

a. Surface of the pileus hirsute to tomentose or velvety.

62. **Polyporus hirsutulus** Schw.

Coriolus hirsutulus (Schw.) Murr.

Pileus sessile or effused-reflexed, often imbricate, coriaceous, dimidiate, 0.5-2 × 1-3 × 0.1-0.2 cm.; surface grayish to yellowish brown, hirsute or strigose, somewhat indistinctly zonate; margin thin, acute, usually sterile below; **context** white, fibrous, less than 1 mm. thick, the hyphae rarely branched, thick-walled, sometimes somewhat incrusted, 5-8 μ in diameter; **tubes** white, less than 2 mm. long, mouths whitish to yellowish, circular to angular, averaging 3-5 per mm., the edges thin, entire; cystidia none; hyphal pegs rare, 15-30 μ in diameter, projecting up to 35 μ; basidia 3.5-4.5 μ in diameter; **spores** hyaline, smooth, cylindrical, 4-5.5 × 1.5-2 μ.

On branches of hardwoods. Summer and fall. Probably frequent. No doubt it has often been placed under *P. versicolor,* from which it differs by the more strigose and less markedly zonate surface.

Illustrations: Overholts, Wash. Univ. Studies 3:88. *pl. 3, f. 12, a-d.* 1915.

63. **Polyporus versicolor** (L.) Fries

P. versicolor var. *carneiporus* Peck; *Polystictus versicolor* (L.) Sacc.; *Coriolus versicolor* (L.) Quél.

Pileus sessile or effused-reflexed, coriaceous, usually imbricate, dimidiate, frequently narrowed at the base, 1-5 × 1-6 × 0.1-0.3 cm.; surface very variable in color, white varying through almost all shades of color to brownish or blackish, distinctly zonate with many narrow multicolored zones, villous or velvety; margin thin, sterile or fertile below; **context** white, fibrous, 1 mm. or less thick, the hyphae rarely branched, thick-walled, 5-10 μ in diameter; **tubes** white or whitish, 1-2 mm. long, mouths white, yellowish, or brownish, circular to angular, averaging 3-5 per mm., the edges thin, entire to slightly lacerate; cystidia none; hyphal pegs 15-50 μ in diameter, projecting up to 40 μ; basidia 4-5 μ in diameter; **spores** hyaline, smooth, cylindrical, straight to slightly curved, 5-7 × 1.5-2.5 μ.

On the wood of deciduous and sometimes of coniferous trees. Common. Summer and fall.

Illustrations: Hard, Mushrooms, p. 413, *f. 343.* 1908; Hesler, Jour. Tennessee Acad. Sci. 4:6, *f. 3.* 1929; Marshall, Mushroom Book, p. 112. 1905; Moffatt, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 17, f. 1.* 1909 (as Polystictus); Shope, Ann. Missouri Bot. Gard. 18:410. *pl. 16, f. 2.* 1931; Stevens, Phytopathology 2:118. *pl. 10.* 1912; White, Connecticut Geol. and Nat. Hist. Surv. Bull. 3:64. *pl. 36.* 1905 (as Polystictus).

Type of rot: white spongy rot of deciduous trees, see Bayliss, Jour. Econ. Biol. 3:1-24. 1908 (biology); Birmingham, Agric. Gaz., New South Wales, 47:507-511. 1936; Campbell and Davidson, Jour. Forestry 38:963-965. 1940; Essig, Univ. California Publ. in Botany 7:447-498. 1922; Jay, Kew Bull. 10:409-424. 1934; Scheffer, U. S. Dept. Agric. Tech. Bull. 527. 1936; Stevens, Mycologia 4:263-270. 1912, and in Phytopathology 2:114-119. 1912; von Schrenk and Spaulding (**17**, pp. 47, 48, 53-56); and Zeller, Oregon Agric. Exper. Sta. Circ. 73. 1926.

64. **Polyporus zonatus** Fries

P. zonatus var. *imperfectus* Peck; *Polystictus zonatus* (Fries) Sacc.; *Coriolus zonatus* (Fries) Quél.

Pileus sessile or effused-reflexed, coriaceous, dimidiate, often narrowed at the base, 1-3 × 1-5 × 0.2-0.4 cm.; surface gray with concentric zones of buff or orange, or more or less concolorous with zones of different shades, minutely velvety to short villous; margin thin, sterile below; **context** white, corky, 1-3 mm. thick, the hyphae occasionally branched, thick-walled, 4-12 μ in diameter; **tubes** white to ochraceous, 1-2.5 mm. long, mouths concolorous, angular, averaging 3-4 per mm., the edges thin, becoming dentate with age; cystidia none; hyphal pegs 12-18 μ in diameter,

projecting up to 40 μ; basidia 4-5 μ in diameter; **spores** hyaline, smooth, cylindrical, 6-8 $\times$ 2-3 μ.

On the wood of deciduous trees. Uncommon. Summer and fall. Very closely related to *P. versicolor*, differing only in the thicker context.

65. **Polyporus hirsutus** (Wulf.) Fries

Polystictus hirsutus (Wulf.) Sacc.; *Coriolus nigromarginatus* (Schw.) Murr.

Pileus sessile or effused-reflexed, coriaceous to rigid, imbricate or solitary, 1-7 $\times$ 2-10 $\times$ 0.2-1 cm.; surface grayish to yellowish or brownish, hirsute or tomentose, usually concentrically sulcate and zonate; margin sometimes dark colored, thin to thick, sterile below; **context** white to pallid, tough to soft-corky, 1-6 mm. thick, the hyphae rarely branched, thick-walled, 4-7 μ in diameter; **tubes** white, yellowish, or pale smoky, 1-4 mm. long, mouths concolorous, circular, averaging 3-4 per mm., the edges usually thick and entire; cystidia none; hyphal pegs occasionally present, hyaline, usually incrusted, 15-40 μ in diameter, projecting up to 50 μ; basidia "5-6 μ broad" (Shope); **spores** hyaline, smooth, cylindrical to allantoid, 5-8 $\times$ 2-3 μ.

On the wood of deciduous and rarely of coniferous trees. Common. Summer and fall.

Illustrations: Hard, Mushrooms, p. 412, *f. 342*. 1908; Overholts, Wash. Univ. Studies 3:88. *pl. 3, f. 14, a-b*. 1915; Owens, Prin. Plant Path., p. 439, *f. 152*. 1928 (as Polystictus); Shope, Ann. Missouri Bot. Gard. 18:412. *pl. 17, f. 3*. 1931.

Type of rot: white spongy sapwood rot of deciduous trees, see Hubert (3, p. 369), and Pilát, Ochrana Rostlin 10^3:57-65. 1930 (Abstr. in Rev. Appl. Mycology 10:112, 113. 1931).

66. **Polyporus pubescens** (Schum.) Fries

P. grayii Cooke; *P. velutinus* (Pers.) Fries; *Coriolus pubescens* (Schum.) Murr.

Pileus sessile, coriaceous to fleshy-tough when fresh, rather rigid when dry, dimidiate, 1-5 $\times$ 2-5 $\times$ 0.2-1 cm.; surface white to yellowish or ochraceous, "rarely umber" (Overholts), short villose-tomentose to finely tomentose, varying to almost glabrous, inconspicuously zonate to azonate; margin thin, sterile or fertile below; **context** white, fibrous-tough when fresh, firmer when dry, 1-5 mm. thick, the hyphae occasionally branched, thick-walled, 4-8 μ in diameter; **tubes** concolorous, 1-4 mm. long, mouths white, yellowish, or "umber" (Overholts), angular, averaging 3-4 per mm., the edges thin and often dentate; cystidia none; hyphal pegs 12-20 μ in diameter, projecting up to 30 μ; basidia 5-7 μ in diameter; **spores** hyaline, smooth, cylindrical, straight to slightly curved, 5-6 $\times$ 1.5-2 μ.

On the wood of deciduous trees. Common. Summer and fall. *P. velutinus* is the thin form.

Illustrations: Hard, Mushrooms, p. 410, *f. 339.* 1908; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:164. *pl. 4, f. 21* (as *P. velutinus*) and p. 178, *pl. 11, f. 36, a-c.* 1914; Overholts, Wash. Univ. Studies 3:88. *pl. 3, f. 15, a-b.* 1915.

Polyporus scrobiculatus Overh. (*Mycologia* 33:91. 1941) has been collected in Pennsylvania and it may be found here. It differs in having spores 3-4 μ wide, and context hyphae 3-5 μ in diameter.

b. Surface of the pileus finely tomentose to glabrous (compare also 66. P. pubescens; 70. P. semisupinus; 71. P. floriformis; 82. P. semipileatus; and 90. P. anceps).

67. **Polyporus conchifer** (Schw.) Fries

P. virgineus (Schw.) Fries; *Polystictus conchifer* (Schw.) Sacc.; *Poronidulus conchifer* (Schw.) Murr.

Pileus substipitate to sessile, the stem when present represented by a small lateral tubercle, or rarely the pileus centrally attached and somewhat umbilicate, usually bearing a small cup-shaped sterile structure at the base on the upper side, coriaceous, reniform to dimidiate, or, when centrally attached, more or less circular, 1-4 × 1-4 × 0.2-0.4 cm.; surface white to yellowish, rarely marked with brownish concentric zones, glabrous, zonate to azonate; margin very thin, sterile or fertile below; **context** white, fibrous, 1 mm. or less thick, the hyphae rarely to often branched, thick- to thin-walled, 2-6 μ in diameter, the larger usually rarely branched; **tubes** white, not more than 2 mm. long, mouths white to yellowish, angular, averaging 3-4 per mm., the edges thin, usually dentate to lacerate or incised; cystidia none; hyphal pegs 20-80 μ in diameter, projecting 20-70 μ; basidia 5-6 μ in diameter; **spores** hyaline, smooth, cylindrical to slightly curved, 6-7.5 × 1.5-2 μ.

On branches of elm. Common. Summer and fall. The cup-shaped sterile structures are diagnostic for the species.

Illustrations: Icones Farlowianae, p. 101, *pl. 91.* 1929 (as Polystictus); Lloyd, Polyp. Issue 3:41. *f. 365-366.* 1910 (as Polystictus); Moffat, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 16, f. 2.* 1909 (as Polystictus); Murrill, Mycologia 10:107. *pl. 6, f. 2.* 1918; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:164. *pl. 4, f. 20, a-c.* 1914 (as Polystictus); Overholts, Wash. Univ. Studies 3:88, *pl. 3, f. 10, a-e.* 1915.

68. **Polyporus planellus** (Murr.) Overh.

P. planus Peck; *Coriolus planellus* Murr.

Pileus sessile or effused-reflexed, sometimes resupinate, or rarely narrowed at the base and appearing substipitate, coriaceous, 1-4 × 1-4 × 0.1-0.2 cm.; surface light brown to dark brown, zonate with darker zones, velvety to glabrous; margin thin, light-colored,

velvety, sterile below; **context** pallid to light brown, 1 mm. or less thick, the hyphae somewhat branched, thick-walled, 2.5-4 μ in diameter; **tubes** pallid to brownish, 1 mm. or less long, mouths whitish to brownish, often white-incrusted, angular to daedaloid, or often more or less hexagonal, averaging 5-6 per mm., the edges moderately thick, entire; cystidia none; basidia 6-8 μ in diameter; **spores** hyaline, smooth, cylindrical to ellipsoid, 9-12 $\times$ 3.5-4.5 μ.

On the wood of deciduous trees. Rare. Summer and fall. This species belongs much more properly under the genus Trametes, in the section with pale brown context, close to *Trametes mollis*, but the writer does not wish to make a new combination in a genus of such doubtful worth as the genus Trametes.

Trametes Kmetii Bres. is very close if not identical to *P. planellus*, and Baxter (Pap. Michigan Acad. Sci., Art, Lett. 24:184. 1939) refers it to *P. stereoides* Fries sense of Romell.

Illustrations: Baxter as above, p. 188, *pl. 7* (as *P. stereoides*); and Shope, Ann. Missouri Bot. Gard. 18:422. *pl. 22, f. 1.* 1931.

B. Fruiting body subcoriaceous to fleshy tough when fresh; context 0.5-3 mm. thick.

1. Spores allantoid.

69. **Polyporus undosus** Peck

Tyromyces undosus (Peck) Murr.

Pileus effused-reflexed or resupinate, subcoriaceous to fibrous-fleshy when fresh, rigid when dry, often laterally confluent, 0-0.7 $\times$ 2-9 $\times$ 0.2-0.3 cm.; surface whitish or yellowish to brownish, slightly spongy-tomentose, obscurely sulcate zoned; margin very thin, undulate, fertile below; **context** white, fleshy-fibrous to fragile, not over 1 mm. thick, the hyphae rarely to frequently branched, often irregular, thick-walled, 5-8 μ in diameter; **tubes** white, 1-3 mm. long, mouths concolorous, irregular, angular, 1-2 per mm., the edges thin, dentate to incised; cystidia none; basidia 4.5-5 μ in diameter; **spores** hyaline, smooth, allantoid, 4-5 $\times$ 1.5-2 μ.

On the wood of coniferous or more rarely of deciduous trees. Rare. Summer and fall.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 317, *f. 657.* 1915; Lowe, Papers Michigan Acad. Sci., Arts, Lett. 19. *pl. 11, f. 4-5.* 1934.

2. Spores ellipsoid to ovoid (compare also 75a. P. spumeus var. malicola).

70. **Polyporus semisupinus** Berk. and Curt.

Tyromyces semisupinus (Berk. and Curt.) Murr.

Pileus sessile or narrowed at the base and appearing substipitate, sometimes excentrically attached, often in the form of a rosette, very tough when fresh, rigid and brittle when dry, imbri-

cate, 1-2.5 × 0.5-1.5 × 0.05-0.15 cm.; surface whitish to yellowish, usually with radial streaks which appear more or less resinous or cartilaginous when dry, glabrous, faintly zonate, sometimes with short, sterile proliferations; margin thin, acute, often resinous when dry, fertile below; **context** white to pallid, firm when dry, 1 mm. or less thick, the hyphae rarely branched, usually thick-walled, sometimes thin-walled, 2.5-4.5 μ in diameter; tubes whitish to yellowish or yellowish brown, not over 1 mm. long in specimens seen ("2-3 mm. long," Murrill), mouths concolorous, angular, averaging 4-8 per mm., the edges thin, entire; cystidia none; basidia 4-4.5 μ in diameter; **spores** hyaline, smooth, ellipsoid to ovoid, 2.5-4 × 2-3 μ.

On the wood of deciduous trees. Frequent in the Adirondacks. Summer and fall.

Illustrations: Lowe, Papers Michigan Acad. Sci., Arts, Lett. 19. *pl. 15, f. 2.* 1934.

Polyporus lineatus Overh. (*Mycologia* 33:101. 1941) has been collected in Pennsylvania and may be found here. It differs in having pores 2-4 per mm., and spores cylindric, 4-5 × 1 μ.

71. **Polyporus floriformis** Quél.

Pileus usually narrowed to a stem-like base, sometimes in the form of a rosette and with a central stem-like point of attachment, imbricate, subcoriaceous, becoming rather rigid when dry, 1-4 × 1-5 × 0.1-0.4 cm.; surface white when fresh, discoloring to grayish or slightly brownish when dry, azonate or nearly so, nearly glabrous; margin thin, usually narrowly sterile below; **context** white, azonate, subcorky when fresh, very hard when dry, taste slightly acid, 1-2 mm. thick, the hyphae rarely branched, usually thick-walled, 4-5 μ in diameter; **tubes** white when fresh, discoloring on drying, 1-3 mm. long, mouths whitish to yellowish, circular to angular, averaging 4-6 per mm., the edges at first thick and entire, becoming thin and slightly lacerate; cystidia none; basidia 4-5 μ in diameter; **spores** hyaline, smooth, broadly ellipsoid to ovoid, sometimes very slightly curved, 3.5-5 × 2-2.5 μ.

On the wood of coniferous and perhaps of deciduous trees. It is said to grow at the base of larch trees in Europe; the writer has collected it from that habitat in Michigan. The species is close to *P. semisupinus*, but differs in the absence of any cartilaginous streaks on the surface of the pileus, by the thicker context, and perhaps by the kind of substratum.

Illustrations: Lowe, Papers Michigan Acad. Sci., Arts, Lett. 19. *pl. 15, f. 1.* 1934.

72. **Polyporus balsameus** Peck

P. crispellus Peck; *Coriolus balsameus* (Peck) Murr.; *Tyromyces balsameus* (Peck) Murr.; *T. crispellus* (Peck) Murr.

Pileus sessile or narrowed behind and appearing substipitate, subcoriaceous to fleshy-tough when fresh, rather rigid when dry,

1-3 × 2-5 × 0.2-0.5 cm.; surface whitish to pale brownish, subglabrous to slightly and unequally appressed villose-tomentose, marked by rather faint concentric zones, sometimes, at least, becoming reddish where bruised; margin thin, narrowly sterile below; **context** white, fibrous, slightly zonate, 1-3 mm. thick, the hyphae rarely branched, moderately thick- to thin-walled, 5-9 μ in diameter; **tubes** white to discolored within, 1.5-3.5 mm. long, mouths concolorous, subcircular to angular, 3-6 per mm., edges thin and finely dentate, or rather thick and entire; **cystidia** thin-walled, not incrusted, 4-9 μ in diameter, projecting up to 20 μ; basidia 4-5 μ in diameter; **spores** hyaline, smooth, apiculate, often one-guttulate, ellipsoid to ovoid, 3-5 × 2-3 μ.

On the wood of coniferous trees, recorded on balsam, hemlock, and spruce. Rare. Summer and fall.

Illustrations: Hubert, Phytopathology 19:729. *f. 3.* 1929, and in Outl. For. Path., p. 345, *f. 89.* 1931; McCallum, Bull. Canada Dept. Agr. N.S. 104: *pl. 7, f. 2-3.* 1928.

Type of rot: butt rot of balsam, see Boyce (**2**, pp. 465-468); Heimberger and McCallum, Pulp Paper Mag. (Canada) 41:301-303. 1940; Hubert in Phytopathology 19:725-732. 1929, and in (**3**, pp. 340-347); Kaufert, Univ. Minnesota Agric. Exper. Sta. Tech. Bull. 110. 1935; and McCallum, Bull. Canada Dept. Agr. N.S. 104. 1928.

Polyporus floriformis Quél. and *P. tephroleucus* Fries are regarded as synonyms of *P. balsameus* by Hubert (*Phytopathology* 19:725. 1929). *P. floriformis* is white when fresh and lacks cystidia. *P. tephroleucus* has spores of quite a different shape.

Polyporus subcartilagineus Overh. (*Mycologia* 33:90. 1941) has been collected in neighboring areas and may be found here. It differs in having spores 4.5-6.5 μ long, and in not having cystidia.

C. Fruiting body soft and watery when fresh, the context usually 2-5 mm. or more thick, or, if fleshy-tough to corky or subcoriaceous, the context usually thick.

1. Spores ellipsoid to subglobose.

a. Pores small, 2-6 per mm.

(1) Spores 2.5-4.5 μ long.

73. Polyporus fumidiceps Atk.

Tyromyces fumidiceps Atk.

Pileus sessile or effused-reflexed, soft and watery when fresh, imbricate, often laterally confluent, with a strong or faint fragrant odor when fresh, 1-4 × 2-5 × 0.5-1 cm.; surface grayish to grayish brown, minutely pubescent to glabrous, sometimes with short bundles or fascicles of hyphae giving a somewhat tubercular appearance, azonate; margin abruptly thin, sterile below; **context** white or slightly grayish on drying, soft and watery when fresh, rather hard and fragile when dry, azonate, 2-5 mm. thick, the

hyphae somewhat branched, thick-walled, 3-4.5 μ in diameter; **tubes** white, often turning a light green within on cutting or on drying, the color usually soon fading, 3-6 mm. long, mouths white to pallid, or with a greenish tint which is somewhat more persistent than the color in the tubes, circular to angular, averaging 4-5 per mm., the edges moderately thick, entire; cystidia not observed; basidia 3 μ in diameter; **spores** hyaline, smooth, one-guttulate, ellipsoid to subglobose, 2.5-4 $\times$ 2-3 μ.

On the wood of deciduous trees, recorded only on willow. Rare. Summer and fall. The gray surface and the color change of the bruised tubes are the distinctive characters.

Illustrations: Overholts, Ann. Missouri Bot. Gard. 2:726. *pl. 23, f. 6.* 1915.

74. Polyporus galactinus Berk.

Pileus sessile, soft and watery when fresh, imbricate or solitary, dimidiate, with a fragrant odor when fresh, 3-8 $\times$ 5-10 $\times$ 1-3 cm.; surface white to gray and smooth when fresh, when dry yellowish to light yellowish brown and varying from matted tomentose to scrupose or to more or less strigose, especially at the base, azonate; margin abruptly thin, narrowly sterile below; **context** white to pallid, watery and spongy when fresh, when dry hard and strongly zonate, sometimes resinous appearing, 0.3-2 cm. thick, the hyphae rarely branched, thin-walled, 4-6 μ in diameter; **tubes** white to ochraceous or brownish, 5-10 mm. long, mouths more or less concolorous, angular, averaging 4-6 per mm., the edges thin, entire to fimbriate; cystidia none; basidia 4.5-5 μ in diameter; **spores** hyaline, smooth, one-guttulate, ellipsoid to subglobose, 3-4.5 $\times$ 2-3 μ.

On very rotten wood of deciduous trees. Frequent. Summer and fall. Very close to *P. spumeus* var. *malicola* but differing in growing on very rotten logs and in having somewhat smaller pores.

Illustrations: Dodge, Mycologia 8:14. *pl. 175.* 1916; Lloyd, Synop. Apus Polyporus, p. 306, *f. 643-646.* 1915; Overholts, Ann. Missouri Bot. Gard. 2:728, *pl. 24, f. 12, 15, 17.* 1915.

Polyporus iowensis Lloyd, *Mycol. Notes* 75:1363 and *pl. 344, f. 3257.* 1925, has been found in a neighboring state and it will probably be found in New York State. It differs from *P. galactinus* in the changes which take place upon drying. The pileus discolors but slightly; the surface becomes glabrous to slightly roughened; and the context becomes soft and friable, and is azonate. A more complete description is given by Miss Wolf (**18**, p. 63), and Lowe, Papers Michigan Acad. Sci., Arts, Lett. 19:145. 1934.

Illustrations: Lloyd, as cited, and Lowe, in paper cited, *pl. 15, f. 5.*

Polyporus abieticola Overh. (*Mycologia* 33:93. 1941) has been collected in Quebec and may be found here. It differs in growing on coniferous substrata, pores 3-4 per mm., and spores 2.5-3 $\times$ 2-2.5 μ. *P. canadensis* Overholts (*Ibid.*, p. 97), which has been collected in Ottawa, may be found here. It differs in having spores 2-3 $\times$ 1.5-2 μ.

(2) Spores 4.5-7 μ or more long.

75. **Polyporus spumeus** (Sow.) Fries

Spongipellis occidentalis Murr.

Pileus sessile, or rarely narrowed behind and appearing substipitate, subimbricate, soft and watery when fresh, rigid and brittle when dry, dimidiate, usually with an anise-like odor when fresh, 5-20 × 5-20 × 1-4 cm.; surface white when fresh, yellowish to brownish when dry, hirsute or more often on drying becoming matted-tomentose to nearly glabrous, azonate; margin thin to thick, fertile or sterile below; **context** white to slightly yellowish, soft when fresh, usually duplex when dry, firm-fibrous below, spongy above, or firm fibrous throughout, zonate, 0.5-3 cm. thick, the hyphae somewhat branched, rather thin-walled, 4-6 μ in diameter; **tubes** white to yellowish, 0.5-1.5 cm. long, often collapsing on drying, mouths concolorous, angular, 2-5 per mm., the edges thin and lacerate-dentate; cystidia none; basidia "5-7 μ in diameter" (Shope); **spores** hyaline, smooth, apiculate, one-guttulate, ellipsoid to subglobose, 5-7 × 4-5 μ.

On wounds of living deciduous trees, also on old logs. Rather rare. Fall.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 304, *f. 641-642.* 1915; Overholts, Ann. Missouri Bot. Gard. 2:728. *pl. 24, f. 10-11, 14a.* 1915; Shope, Ann. Missouri Bot. Gard. 18:434. *pl. 28, f. 2.* 1931.

75a. **Polyporus spumeus** var. **malicola** Lloyd

Polyporus malicola Lloyd

As in the typical form but the pileus thinner; context usually less than 2 mm. thick; spores hyaline, smooth, ovoid to subglobose, 4.5-5 × 3.5-4 μ.

On the wood of apple trees. Rather rare. Summer and fall.

According to Lloyd (7, p. 305) this species "is the basis of *Polyporus galactinus* of Murrill's work" (*Spongipellis galactinus* [Berk.] Pat. in No. Amer. Flora 9:39. 1907). Murrill, however, gives the spore size as 3-4 × 1.5-2 μ, which is approximately the spore size of *P. galactinus* as described in this manual. The writer has not measured the spores from any of Murrill's specimens of *S. galactinus.*

76. **Polyporus spraguei** Berk. and Curt.

Tyromyces spraguei (Berk. and Curt.) Murr.

Pileus sessile or effused-reflexed, or sometimes strongly narrowed at the base, fleshy-tough and watery when fresh, rigid when dry, subimbricate or solitary, dimidiate or flabelliform, often with a very disagreeable odor when fresh, 4-10 × 5-15 ×

0.5-3 cm.; surface white to grayish, appressed-tomentose to glabrous, azonate to somewhat zonate, usually roughened, sometimes somewhat tubercular; margin often blackening in dried specimens, thin to rather thick, fertile below; **context** white or whitish, watery and fibrous-tough when fresh, usually very hard when dry, zonate, 0.3-2.5 cm. thick, the hyphae somewhat branched, thick-walled, sometimes thin-walled, 4-7 μ in diameter; **tubes** white to ochraceous, sometimes darkening on drying, 0.3-1 cm. long, mouths concolorous, angular, averaging 4-5 per mm., the edges thin, entire; cystidia none or represented by scarcely projecting, non-incrusted, hyaline, pointed bodies 4.5-5 μ in diameter; basidia not observed; **spores** hyaline, smooth, one-guttulate, apiculate, ovoid to subglobose, 4.5-5.5 $\times$ 4-5 μ.

On the wood of deciduous trees. Rather common. Summer and fall.

Type of rot: brown heartrot in oaks, chestnut, and persimmon, see Weir in Phytopathology 13:288. 1923, and in Phytopathology 17:339-340. 1927.

77. **Polyporus robiniophilus** (Murr.) Lloyd

Trametes robiniophila Murr.

Pileus sessile, somewhat watery but firm when fresh, firm and corky when dry, rarely imbricate, turning brownish on drying, 3-10 $\times$ 4-15 $\times$ 1-7 cm.; surface white to cinereous or yellowish when fresh, usually brownish when dry, nearly glabrous, azonate to subzonate, concentrically sulcate in large specimens; margin at first thick and obtuse, becoming thin and acute when mature, sterile below; **context** white when fresh, when dry light brown, soft and punky to corky, "often with a sweet odor" (Overholts), 0.5-6 cm. thick, the hyphae rarely to occasionally branched, thick-walled, of two diameters: some 6-9 μ, others 1-3 μ; **tubes** concolorous with the context, 0.3-1 cm. long, the mouths concolorous, sometimes darker, circular to angular, averaging 4-6 per mm., the edges thick, entire; cystidia none or represented by two types of structures: some cystidia-like with swollen bases and blunt apices, 4-8 μ in diameter, others hyphae-like, 1.5-2.5 μ in diameter, projecting up to 40 μ; basidia 10 μ in diameter; **spores** hyaline, smooth, apiculate, often one-guttulate, ovoid to subglobose, 6-9 $\times$ 5.5-7 μ.

On the wood of locust (Robinia). Rare. Late summer and fall.

Illustrations: Hesler, Jour. Tennessee Acad. Sci. 4:4. *f. 1.* 1929; Lloyd, Synop. Apus Polyporus, p. 315, *f. 653.* 1915; Overholts, Wash. Univ. Studies 3:90. *pl. 4, f. 17, a-b.* 1915.

Type of rot: white heartrot of locust, see Kauffman and Kerber, Amer. Jour. Bot. 9:493-508. 1922.

b. Pores usually 1-2 per mm. or larger.

78. **Polyporus borealis** Fries

Spongipellis borealis (Fries) Pat.

Pilei substipitate, narrowed at the base, or more rarely sessile, flabelliform to dimidiate, watery-tough when fresh, drying decidedly fibrous-tough, 3-12 × 3-12 × 0.5-2.5 cm.; surface white, yellowish, or brownish, coarsely hispid to tomentose or fibrillose, spongy when fresh, azonate; margin thin, in dried specimens often assuming a distinctly resinous appearance, fertile below; **context** white, usually duplex when dry, firm and fibrous next the tubes, coarsely fibrous above, somewhat zonate in dried specimens, 0.5-2 cm. thick, the hyphae rarely branched, thin-walled, often collapsing, 4-8 μ in diameter; **tubes** white when fresh, yellowish or light yellowish brown on drying, often collapsed in dried specimens, 3-10 mm. long, mouths concolorous, angular to daedaloid, irregular, averaging 1-3 per mm., the edges thin, becoming lacerate with age; **cystidia** abundant or rare, hyaline or nearly so, ventricose, 8-15 μ in diameter, projecting up to 16 μ, but usually entirely imbedded in the hymenium; basidia 5-7 μ in diameter; **spores** hyaline, smooth, ellipsoid to ovoid, 4-7 × 3-4 μ.

On stumps and logs of coniferous trees. Common. Summer and fall.

Illustrations: Atkinson, Cornell Univ. Agr. Exp. Sta. Bull. 193: 200, *f. 56*, p. 201. *f. 57*, p. 202, *f. 58*, p. 203, *f. 59*, p. 207, *f. 63*. 1901, and in Mushrooms, ed. 3, p. 9, *f. 9*. 1911; Lloyd, Synop. Apus Polyporus, p. 326, *f. 668-670*. 1915; Shope, Ann. Missouri Bot. Gard. 18:418. *pl. 20*. 1931.

Type of rot: cuboidal heartwood rot of conifers, see Jørstad and Juul, Medd. Skogforsøksv. 22:300-496. 1938; Rankin (**16**, pp. 185-186); and Tikka, Acta Forest. Fenn. 40:293-308. 1934.

79. **Polyporus delectans** Peck

Spongipellis delectans (Peck) Murr.

Pileus sessile or effused-reflexed, soft and watery when fresh, firm to rigid when dry, sometimes imbricate, 3-10 × 5-15 × 1-4 cm.; surface white to yellowish, finely tomentose to almost glabrous or, on drying, becoming coarsely and roughly short strigose, azonate; margin usually abruptly thinning, acute, sterile below; **context** white, often duplex when dry, soft and friable above, firm below, azonate, 0.5-2 cm. thick, the hyphae rarely branched, thick- or thin-walled, 4-5 μ in diameter; **tubes** white to pallid, 0.5-1.5 cm. long, the mouths white to yellowish, circular to sinuous, averaging 1-2 per mm., the edges thin, dentate to finely lacerate; cystidia none; basidia 5.5-7 μ in diameter; **spores** hyaline, smooth, often one-guttulate, ellipsoid to subglobose, 5-7 × 4-5.5 μ.

On old logs or growing from wounds in living trees. Rather rare. Late summer and fall.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 325, *f. 667*. 1915; Overholts, Ann. Missouri Bot. Gard. 2:728. *pl. 24, f. 14 b*. 1915.

80. **Polyporus obtusus** Berk.

Spongipellis unicolor (Schw.) Murr.; *Trametes unicolor* (Schw.) Murr.

Pileus sessile, spongy to firm, convex to ungulate, dimidiate, 3-10 × 4-20 × 3-6 cm.; surface white to yellowish or grayish, often brownish in dried specimens, hirsute-tomentose, rarely becoming glabrous, azonate; margin thick, obtuse, fertile below; **context** white, or brownish in dried specimens, sometimes duplex, spongy when fresh, firm to corky when dry, faintly zonate, 1-3 cm. thick, the hyphae rarely branched, very thick-walled, 4.5-6 μ in diameter; **tubes** white, or yellowish to light brown on drying, 1.5-3 cm. long, mouths concolorous or somewhat darker, circular to angular or sinuous, sometimes confluent, 1 mm. or more wide, the edges thin and fimbriate-dentate to slightly lacerate; cystidia none, or represented by thin-walled, more or less flexuous bodies imbedded in the hymenium, or projecting up to 10 μ, 3.5-5 μ in diameter; basidia 5-6.5 μ in diameter; **spores** hyaline, smooth, broadly ellipsoid to subglobose, 6-8 × 5-6 μ.

On the wood of deciduous trees. New York is within the range of the species but it has not yet been reported for the state. The texture of the dried plant is Trametes-like and Murrill (8) and Lohwag (*Arch. für Protistenk.* 75:297-312. 1931) place this species in the genus Trametes.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 324, *f. 666*. 1915, and in Mycol. Notes 67: *pl. 210, f. 2205*. 1922; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:160. *pl. 2, f. 11, a-c*. 1914 (as Daedalea); Overholts, Wash. Univ. Studies 3:88. *pl. 3, f. 13, a-b*. 1915; Spaulding, Ann. Rept. Missouri Bot. Gard. 16:116. *pl. 13-15*. 1905; von Schrenk and Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull. 149:41. *f. 5*. 1909.

Type of rot: soft heartrot of oaks, see Spaulding, Rept. Missouri Bot. Gard. 16:109-116. 1905, or von Schrenk and Spaulding. (**17**, pp. 41-42).

81. **Polyporus fissilis** Berk. and Curt.

Spongipellis fissilis (Berk. and Curt.) Murr.

Pileus sessile, soft and watery when fresh, hard and rigid when dry, subimbricate or solitary, dimidiate to flabelliform, 4-6 × 7-15 × 1-2 cm.; surface white and minutely spongy tomentose when fresh, drying brownish discolored, wrinkled, setose or fibrillose to subglabrous, azonate; margin rather thin to thick, fertile below; **context** white and watery when fresh, drying sordid, fibrous, very hard, and conspicuously zonate, 5-10 mm. thick, composed of more or less parallel strands of thin-walled, rarely branching, adhering hyphae bound by a network of much branched hyphae, the hyphae

3-7 μ in diameter; large numbers of imbedded spores present in the context tissue; **tubes** white when fresh, on drying changing to brownish yellow or darkening to black and becoming resinous and collapsing into a rigid mass, 3-8 mm. long, mouths concolorous, angular, 1-2 per mm., the edges thin, nearly entire; cystidia none; basidia 6 μ in diameter; **spores**[1] hyaline, smooth, ovoid to subglobose, 5-7 $\times$ 3-5 μ; "ovoid or ellipsoid, hyaline, 3.5-4.5 $\times$ 3-3.5 μ" (Overholts).

On the trunks of deciduous trees, recorded only on maple. Very rare, one collection known, Tully, L. H. Pennington. The species is typically more southern in its distribution.

When dry compare 50. *P. croceus.*

Illustrations: Dodge, Mycologia 8:14. *pl. 176.* 1916.

Type of rot: heartrot of apple, see Dodge, Mycologia 8:5-15. 1916.

Polyporus compactus Overholts *Bull. Torrey Bot. Club* 49:170-172 and *pl. 9, f. 5-6.* 1922 has been collected in Pennsylvania and New Jersey and eventually, no doubt, will be found in New York State. The pileus sessile to more commonly effused-reflexed or resupinate, often much deformed, up to 10 cm. along the substratum, up to 1.5 cm. in forward dimension, and up to 1.5 cm. thick when resupinate, "corky-watery when fresh" (Overholts), soft- to hard-corky when dry, the surface of the pileus cream white to pale brown, or "gray" (Overholts), essentially glabrous (but soft and no pellicle), azonate, the margin usually rounded, fertile or narrowly sterile below; context pale cream to pale brown, soft to firm corky when dry, azonate to faintly zonate, up to 1 cm. thick, sometimes friable when dry, the hyphae rarely to frequently branched, thin- to thick-walled, no clamps or cross walls seen, 2.5-7 μ in diameter, bearing truncate to broadly ovate, hyaline to pale brownish (under microscope), smooth chlamydospores 8-11 $\times$ 7-9 μ; tubes concolorous with the context, 1-4 mm. long, the mouths white to cream brown, circular to slightly elongated, averaging 3-4 per mm. on inclined surfaces, the edges entire, thick to thin; cystidia scarcely projecting and very inconspicuous, hyaline, about 7 μ in diam., or "3-4 μ" (Overholts); basidia 7-8 μ in diam., or "9-10 μ" (Overholts); spores hyaline, ellipsoid to ovoid or truncate, 8-10 $\times$ 4.5-6 μ.

On the wood of oak. According to Davidson *et al.* (*Phytopathology* 27:127. 1937) and Lorenz and Christensen (mimeographed report, "A Survey of Forest Tree Diseases and Their Relation to Stand Improvement, etc.", U. S. Dept. Agr. and C. C. C., Oct. 7, 1937) this plant causes an important butt rot of oaks.

2. Spores allantoid or cylindrical to cylindric-ellipsoid.

a. Spores allantoid, or at least slightly curved; pileus when fresh unchanging or turning bluish where bruised.

82. Polyporus semipileatus Peck

Tyromyces semipileatus (Peck) Murr.; *P. semisupinus* Berk. sense of Lloyd.

Pileus effused-reflexed, usually largely resupinate, spongy and watery when fresh, rigid when dry, dimidiate to elongate, 0-1.5 $\times$ 1-4 $\times$ 0.2-0.5 cm.; surface white, yellowish, "or reddish brown"

[1] Most spores seen were undoubtedly from the context. One attached spore was seen. It did not differ appreciably from the free spores in the mount.

(Overholts), minutely tomentose to glabrous, azonate; margin thin, acute, narrowly sterile below; **context** white or whitish, soft when fresh, firm when dry, 1-4 mm. thick, the hyphae rarely branched, rather thin-walled, 3-5 μ in diameter; **tubes** less than 2.5 mm. long, mouths white or whitish, "or greenish, or somewhat violaceous" (Overholts), angular, averaging 4-6 per mm., the edges thin, entire; cystidia none, "or represented by tufts of hyaline projecting hairs" (Overholts); basidia 3-4 μ in diameter; **spores** hyaline, smooth, allantoid, 3-4 $\times$ 1 μ.

On the wood of deciduous trees. Uncommon. Summer and fall. European authorities place this species in synonymy with *P. chioneus* Fries sense Bresadola.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 316, *f.* 654-655. 1915 (as *P. semisupinus*); Overholts, Wash. Univ. Studies 3:90. *pl. 4, f. 18, a-b*. 1915.

83. **Polyporus albellus** Peck

Pileus sessile, soft and watery when fresh, rigid when dry, dimidiate, 2-8 $\times$ 2-8 $\times$ 1-3 cm.; surface white to yellowish or grayish, finely tomentose to glabrous, sometimes with a pellicle, azonate; margin acute, sterile or fertile below; **context** white, soft to firm when dry, usually not showing a fibrous or fissile appearance where broken when dry, azonate, 0.5-2.5 cm. thick, the hyphae often branched, thin- to thick-walled, 3-7 μ in diameter; **tubes** white or whitish, 1-5 mm. long, the mouths white to yellowish, more or less circular, averaging 4-5 per mm., the edges entire to fimbriate; cystidia none; basidia 4-5 μ in diameter; **spores** hyaline, smooth, allantoid, 3-4 $\times$ 1-1.5 μ.

On the wood of deciduous trees. Common. Summer and fall.

This species and the following one (*P. tephroleucus*) are troublesome to separate and the writer is following Overholts (**13**) in his treatment. The non-fibrous nature of the dry context and the much-branched hyphae will usually separate it from *P. tephroleucus* but perplexing intermediate conditions will be found and it may be that these characters are but the extremes of only one species. Records of this plant also appear in the herbaria and in the literature under the names of *P. chioneus* Fries and *P. lacteus* Fries.

84. **Polyporus tephroleucus** Fries

Pileus sessile or effused-reflexed, soft and watery when fresh, becoming rigid and fragile when dry, dimidiate, 1-4 $\times$ 2-8 $\times$ 0.5-1.5 cm.; surface white or grayish when fresh, grayish or pale yellowish-brown when dry, finely tomentose to glabrous, mostly with a thin pellicle when dry, azonate; margin abruptly thin, sterile below; **context** white or grayish when fresh, white when dry, usually showing a fibrous and fissile appearance where broken when dry, the hyphae parallel-arranged and rarely branched, thin- to thick-walled, 3-8 μ in diameter; **tubes** white or yellowish when dry, 3-10 mm. long, mouths concolorous or more yellow,

circular to angular, averaging 3-5 per mm., the edges thin, dentate to slightly lacerate; cystidia none; basidia 3-4.5 μ in diameter; **spores** hyaline, smooth, allantoid, 3.5-5 $\times$ 1-1.5 μ.

On the wood of deciduous trees. Common. Summer and fall. The species when well marked can be separated from *P. albellus* by the gray upper surface of the pileus, by the fissile nature of the context, and by the unbranched hyphae of the context, but confusing intermediates will be found.

85. **Polyporus caesius** (Schrad.) Fries

Tyromyces caesius (Schrad.) Murr.; *T. caesiosimulans* Atk.; *Polyporus caesiosimulans* Atk.

Pileus sessile or effused-reflexed, soft and watery when fresh, rigid when dry, dimidiate, when fresh sometimes turning bluish where bruised, 1-5 $\times$ 1-6 $\times$ 0.5-2 cm.; surface white or grayish, rarely bluish gray, villous-pubescent or strigose, or varying to nearly glabrous, azonate; margin thin and acute, fertile below; **context** white, soft and watery when fresh, firm-friable when dry, 3-10 mm. thick, the hyphae sparingly branched, thick-walled, 4-7 μ in diameter; **tubes** white or bluish, 2-7 mm. long, mouths white or grayish blue, unequal, angular, averaging 3-4 per mm., the edges thin, becoming lacerate; cystidia none; basidia 4-5 μ in diameter; **spores** bluish gray in mass, hyaline under the microscope, smooth, slightly curved to allantoid, 3-5 $\times$ 1-1.5 μ.

On the wood of deciduous or of coniferous trees. Frequent. Summer and fall. The bluish gray color of the tubes is one of the best characters to distinguish the plant from closely related sessile white species.

Illustrations: Overholts, Wash. Univ. Studies 3:86. *pl. 2, f. 8, a-b.* 1915; Shope, Ann. Missouri Bot. Gard. 18:434. *pl. 28, f. 3.* 1931.

Polyporus (*Tyromyces*) *caesiosimulans* Atk. *Ann. Mycol.* 6:61. 1908. Described as "A small, thin, soft plant . . ., resembling *Polyporus caesius* but differing in the globose, pedicellate spores." Through the kindness of Dr. H. M. Fitzpatrick of Cornell University, a portion of the type collection was available for examination. Spores of the type described by Atkinson ("minute, globose, hyaline, smooth, minutely pedicellate, 3-4 μ") were abundant in the mount. Such spores were demonstrated to be borne on long filiform hyphae which arose from the hymenial layer. Similar slender hyphae were found in the hymenial layer, but a direct connection between these was not demonstrated with certainty. Spores of the size and shape typical for *P. caesius* were found in the mounts, especially where the spores of the globose type were scarce or lacking. The hymenial layer was not at all distinct, and a basidium was not demonstrated even after repeated attempts. The slender hyphae and globose spores appear to belong to a foreign fungus which grew in the hymenium of the polypore, rather than to be conidiophores and conidia of the polypore. It is probable, therefore, that *P. caesiosimulans* was based upon a specimen of *P. caesius* contaminated with another fungus.

b. Spores allantoid or cylindrical to cylindric-ellipsoid; pileus when fresh turning reddish or brownish where bruised, or changing on drying.

86. **Polyporus mollis** (Pers.) Fries

Pileus sessile, soft and watery when fresh, rigid and fragile when dry, often imbricate, dimidiate, when fresh quickly turning red wherever bruised, the whole fruiting body turning dull red or at least pinkish on drying, 1-3 × 3-8 × 1-3 cm.; surface white when fresh, finely appressed-fibrillose when fresh, glabrous and smooth to minutely reticulate when dry, usually with a thin pellicle, azonate; margin rather thick, acute, fertile below, sometimes blackening on drying; **context** white when fresh, changing quickly on bruising, pinkish and spongy to firm when dry, 0.5-2.5 cm. thick, the hyphae rarely branched, thick-walled to sometimes thin-walled, 4-5.5 μ in diameter; **tubes** white when fresh, drying pinkish red to dark red, 2-5 mm. long, mouths concolorous, sinuate, 2-3 per mm. (when dry), the edges thin and uneven; cystidia none; basidia 4-5 μ in diameter; **spores** hyaline, smooth, allantoid, 4.5-5.5 × 1.5-2 μ.

On the wood of coniferous trees. Rare.

87. **Polyporus fragilis** Fries

Spongipellis fragilis (Fries) Murr.

Pileus sessile or more often effused-reflexed, fleshy and rather soft when fresh, becoming hard and fragile when dry, dimidiate, when fresh quickly turning dark red wherever bruised, the whole fruiting body turning dull red on drying, 2-4 × 3-7 × 0.5-1.5 cm.; surface white or whitish when fresh and unbruised, finely tomentose to nearly glabrous, azonate; margin thin, sometimes blackening on drying, fertile below; **context** white when fresh, reddish when bruised and when dry, soft when fresh, drying firm but very friable, 0.2-1 cm. thick, the hyphae occasionally to rarely branched, thin-walled, 4-7 μ in diameter; **tubes** white when fresh, when bruised and on drying pinkish red to dark red, 2-7 mm. long, mouths concolorous, circular to angular, becoming sinuous or labyrinthiform, averaging 3-5 per mm., the edges thin, uneven; cystidia none; basidia 4.5-5 μ in diameter; **spores** hyaline, smooth, cylindrical and straight, occasionally allantoid, 4.5-5.5 × 1.5-2.5 μ.

On the wood of coniferous trees. Rare. Summer and fall.

Illustrations: Baxter, Pap. Michigan Acad. Sci., Arts, Lett. 24: 188. *pl. 2, f. 1.* 1939; Lloyd, Synop. Apus Polyporus, p. 319, *f. 661.* 1915; Shope, Ann. Missouri Bot. Gard. 18:426. *pl. 24, f. 1.* 1931.

88. **Polyporus ursinus** Lloyd

Pileus effused-reflexed or sessile, spongy, tough, drying hard, dimidiate, solitary or imbricate, 1-5 × 2-10 × 0.5-2.5 cm.; surface at first whitish or pinkish, turning with age or on bruising to a reddish or brownish color, radially appressed-fibrillose to tufted-fibrillose, glabrous with age, azonate; margin thick, obtuse, fertile below; **context** white to pinkish, soft, becoming very hard on drying, 0.5-2 cm. thick, the hyphae frequently branched, irregular,

thick-walled, 4-8 μ in diameter; **tubes** white, discoloring to reddish on drying, 2-7 mm. long, mouths angular to sinuate, averaging 1-3 per mm., the edges rather thin, slightly lacerate with age; **cystidia** numerous, cylindrical, 5-7 μ in diameter, projecting up to 30 μ, sometimes incrusted at their apices; basidia 6-7 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 8-10 $\times$ 2.5-3.5 μ.

On the wood of coniferous trees. Fall. Rare.

Overholts (**13**, p. 25) and Kavina and Pilát (Atlas Champig. 'Europe, Fasc. 36-37, Ser. B, Fasc. 15-16. 1938) apply the name *P. lapponicus* Romell to this species, also Mourashkinsky (see Rev. Appl. Mycology 18:645. 1939) places these two species in synonomy because of the same staining reaction with iodine. Romell's descriptions (Ark. f. Bot., Bd. 11, No. 3, p. 17. 1911 and in Sven. Bot. Tidsk., Bd. 20, Heft 1, pp. 11, 12. 1926) agree very well with the American plant and it is probable that the two species are synonymous.

Illustrations: Lloyd, Synop. Apus Polyporus, p. 319, *f. 659-660.* 1915; Shope, Ann. Missouri Bot. Gard. 18:416. *pl. 19, f. 5-8.* 1931.

c. Spores cylindrical to subellipsoid; pileus when fresh unchanging where bruised.

(1) Spores 5-9 μ long.

89. **Polyporus durescens** Overh.

Pileus sessile, "tough or corky and watery when fresh" (Overholts), hard and rigid when dry, solitary or somewhat imbricate, dimidiate, 3-10 $\times$ 6-15 $\times$ 1-3 ("-4," Overholts) cm., white or grayish or discoloring to wood color or blackish, finely appressed-tomentose or drying rough and somewhat tuberculate, azonate; margin thin or thick, fertile below; context white, "tough and watery when fresh" (Overholts), hard when dry, azonate, 1-3 cm. thick, composed of rarely to occasionally branched, thick-walled, irregular hyphae 2-6 μ in diameter; **tubes** nearly concolorous with the context, up to 7 mm. long or "-10 mm." (Overholts), the mouths concolorous, round to angular, averaging 4-5 per mm., the edges thick or thin; cystidia none; basidia 4-6 μ in diameter; **spores** hyaline, smooth, cylindrical or sometimes narrowed at one end, frequently apiculate, 5-7 $\times$ 2-2.5 μ.

On the wood of deciduous trees, so far collected only twice but it had undoubtedly been confused with *P. spraguei*, which it closely resembles in all its characters except the cylindrical narrow spores. The above description is based upon specimens kindly loaned by Dr. Overholts.

90. **Polyporus anceps** Peck

Tyromyces anceps (Peck) Murr.

Pileus effused-reflexed or resupinate, subcoriaceous when fresh, rigid when dry, often subimbricate, 0-3 $\times$ 3-7 $\times$ 0.5-1.5 cm.; sur-

face white or whitish, often with small reddish spots, nearly glabrous, uneven with small tubercles or slightly pitted or wrinkled; margin slightly reddish where bruised, obtuse to acute, fertile below; **context** white, fibrous-tough when fresh, firm-corky when dry, 1-5 mm. thick, the hyphae thick-walled, of two kinds, some rarely branched, 3-6.5 μ in diameter, others often and sometimes intricately branched, 1-3 μ; **tubes** decurrent, white, remaining white, 4-10 mm. long, mouths white or occasionally yellowish stained where bruised, circular, averaging 3-4 per mm., the edges entire; cystidia none; hyphal pegs present (Mounce); basidia 5-7.5 μ in diameter; **spores** hyaline, smooth, cylindrical, 7-9 $\times$ 3-3.5 μ.

On the wood of coniferous trees, recorded only on pitch pine. Rare. Fall.

Illustrations: Baxter, Papers Michigan Acad. Sci., Arts and Lett. 24[1]:196. *pl. 2;* Kauffman, Mycologia 18:30. *pl. 5.* 1926; Lloyd, Mycol. Notes 47:655. *f. 933-934.* 1917; Shope, Ann. Missouri Bot. Gard. 18:424. *pl. 23, f. 2.* 1931.

Type of rot: red ray rot of coniferous wood, see Boyce (**2**, pp. 425-427); Hubert (**3**, pp. 333-340), and in Northwest Science 2:45-47. 1928.

91. **Polyporus palustris** Berk. and Curt.

Tyromyces palustris (Berk. and Curt.) Murr.

Pileus sessile, fleshy-tough to rigid and somewhat fragile when dry, dimidiate, 2-6 $\times$ 5-10 $\times$ 0.5-2.5 cm.; surface white to slightly yellowish, smooth, glabrous, sometimes rough and tubercular behind; margin thin to thick, becoming more or less reddish on drying, narrowly sterile or fertile below; **context** white, fibrous-fleshy when fresh, firm and somewhat friable when dry, 0.3-2 cm. thick, the hyphae rarely branched, thick-walled, 3.5-6 μ in diameter; **tubes** white to slightly yellowish within, 2-6 mm. long, mouths white to yellowish, circular to angular, averaging 4-5 per mm., the edges rather thin, entire to dentate; cystidia none; basidia 5-6.5 μ in diameter; **spores** hyaline, smooth, apiculate, cylindrical, 6-9 $\times$ 2.5-3 μ.

On the wood of coniferous trees. Rare. Summer. The species is typically much more southern in its distribution.

Illustrations: Lloyd, Mycol. Notes 48:680. *f. 1014.* 1917.

(2) Spores 3-6 μ long.

92. **Polyporus guttulatus** Peck.

P. maculatus Peck; *Tyromyces guttulatus* (Peck) Murr.

Pileus sessile, soft and fleshy when fresh, rigid when dry, sometimes imbricate, dimidiate or sometimes narrowly attached and flabelliform, usually thin and applanate, 3-7 $\times$ 5-12 $\times$ 0.4-1.5 cm.; surface white to yellowish or slightly brownish, glabrous, often marked by round depressed spots, sometimes faintly zonate,

usually with a thin pellicle when dry; margin thin, acute, sterile below; **context** white, soft and fleshy when fresh, rather soft and friable when dry, 0.2-1 cm. thick, the hyphae rarely branched, thin- or thick-walled, 4-8 μ in diameter; **tubes** white, sometimes darkening on drying, 1-5 mm. long, mouths white to ochraceous, occasionally darker, angular, averaging 4-6 per mm., the edges thin, entire to lacerate; cystidia none; basidia 4-6 μ in diameter; **spores** hyaline, smooth, short-cylindrical, 3-5 $\times$ 2-2.5 (3) μ.

On the wood of coniferous trees, and doubtfully on beech. Frequent. Summer and fall. Lloyd (7, p. 301-302) places this species in synonymy with *P. alutaceus* Fries of Europe. The one European specimen so determined that I have seen was in poor condition and insufficient to warrant any conclusions.

93. **Polyporus lowei** (Pilát) comb. nov.

Pileus narrowly reflexed or often resupinate, soft and watery to fleshy-fibrous when fresh, drying firm and fragile, sometimes at least with a slightly fragrant odor when fresh, usually laterally confluent, 0-0.6 $\times$ 1-6 $\times$ 0.2-0.5 cm.; surface when fresh white and minutely pubescent, on drying discoloring to cream with narrow, radially arranged brownish streaks, nearly glabrous, azonate to slightly zonate; margin thin, acute, often reddish resinous when dry, narrowly sterile or fertile below, in resupinate specimens minutely pubescent, on drying detaching and curling away from the substratum; **context** white, fleshy-fibrous when fresh, on drying becoming soft and very friable, 0.25-1 mm. thick, the hyphae rarely branched, thick- or thin-walled, 2.5-5 μ in diameter; **tubes** white, becoming dingy yellowish on drying, 1-4 mm. long, mouths concolorous, regularly angular to elongated and subsinuous, averaging 3-4 per mm., sometimes the dissepiments breaking down to form occasional larger pores, the edges thin, extremely fragile, entire or more often fimbriate to lacerate; cystidia not observed; basidia 5-5.5 μ in diameter; **spores** hyaline, smooth, cylindrical, straight to slightly curved, 4.5-6 $\times$ 1-2 μ.

On the wood of coniferous trees, recorded only on spruce. Very rare, collected but once, Seventh Lake, Adirondacks, September 16, 1921, C. H. Kauffman. Known to the writer from New York State and from Isle Royale, Michigan. Pilát (in Kavina and Pilát, Atlas Champignons 'Europe, Ser. B., Fas. 15-16, p. 205, 1938) has renamed this plant *P. lowei*, citing the collections given above and several Czechoslovakian collections, one of which is designated as the type specimen. The name *P. trabeus* Rostk., used in the original edition, is of very doubtful application.

94. **Polyporus immitis** Peck

P. epileucus var. *candidus* Peck; *Spongipellis galactinus* (Berk.) Pat. of No. Amer. Flora 9:39. 1907 in part.

Pileus sessile, soft and watery when fresh, rigid and brittle when dry, applanate to somewhat convex, imbricate or solitary,

more or less aromatic when fresh, 1-10 × 3-10 × 0.5-3 cm.; surface white, becoming tinged with yellow or brownish on drying, fibrous-hispid or tubercular when dry, more or less rough and uneven, or when on coniferous substrata often more or less chalky, azonate or very slightly zonate; margin thin, acute, fertile below; **context** white, homogeneous or sometimes duplex, soft-spongy and friable above, firm and fibrous below, 0.3-2 cm. thick, the hyphae occasionally branched, usually thick-walled, 3-4 μ in diameter; **tubes** white when fresh, sometimes changing to ochraceous or olivaceous brown on drying, 2-10 mm. long, mouths concolorous, angular to slightly sinuous, 4-6 per mm., the edges thin, at length dentate or lacerate; cystidia none; basidia 5 μ in diameter; **spores** hyaline, smooth, cylindrical, 3.5-5 × 1.5-2(2.5) μ.

On the wood of deciduous trees, often ash, or of coniferous trees. Rather rare. Summer. Most of Peck's determinations under *P. epileucus* should be referred here. The presence of black spots on the rough pileus, and an extremely bitter taste are good field marks for the species.

Illustrations: Lowe, Papers Michigan Acad. Sci., Arts, Lett. 19. *pl. 14, f. 1-3.* 1934 (as *P. albidus*).

This concept of the species includes *P. albidus* (Schaeff.) Fries as described in edit. 1. The identity of that species is uncertain, and Peck's name is used as it is of certain application.

OBSERVATIONS

Amesii Lloyd, *Polyporus.* Reported and described by Lloyd in Lloyd *Letter* 60:1 and Note 327, p. 9, 1915, and in (7, p. 309). Apparently a form of *P. fumosus.*

amygdalinus Berk. and Rav., *Polyporus.* Collected at Greenport, Long Island, by Roy Latham, determined by Lloyd and reported in Lloyd *Letter* 63:14. Note 495. 1916 and in *Torreya* 17:117. 1917. Through the courtesy of Mr. Latham a specimen from the original collection was available for examination. Mr. Latham's specimen has an entirely different appearance than the specimen from R. P. Burke, Alabama (considered authentic by the writer) at the herbarium of the New York Botanical Garden. Mr. Latham's specimen shows exactly the characters of a sessile form of *Polyporus biennis* var. *distortus* in which the outer spongy portion of the context is well developed (5 mm. thick) and the inner firm portion is much reduced (0.25-0.3 mm. thick). The writer has no hesitation in referring Mr. Latham's specimen to *P. distortus.* It appears, therefore, that the New York State record of this southern species is in error.

biformis (Klotzsch) Pat., *Coriolus,* sense Murrill in *Mycologia* 12:7. 1920. Change of name for *P. pargamenus.*

caesarius Fries, *Polyporus.* Reported in *N.Y.S. Mus. Rept.* 43:67(21). 1890. Typographical error for *P. casearius.* Not found at Albany. Near *P. sulphureus.*

casearius, Polyporus. CU No. 22024 and 22024A. Is *P. galactinus.*

carolinensis B. and C., *Polyporus.* Reported by Peck in *N.Y.S. Mus. Rept.* 22:83. 1869. As stated by Lloyd (Lloyd *Mycol. Notes* 29:379. 1908) the Albany specimen is *P. biformis.*

ceriflluus Berk. and Curt., *Polyporus.* Specimen so reported in *N.Y.S. Mus. Rept.* 22:83. 1869 is *P. borealis.*

chioneus Fries, *Polyporus.* This specific name has been used by Murrill (8, p. 35) instead of *P. albellus* and by Overholts as a designation of a species distinct from *P. albellus.*

In his latest paper Overholts (13, p. 21) applies the name *P. albellus* to the species described in his earlier papers (9 and 10) under the name *P. chioneus.*

circinans, Polyporus. Reported in Lloyd *Mycol. Notes* 64:1018. 1920. Collected by L. H. Pennington. Dr. John Stevenson writes of this specimen in the Lloyd Herbarium, "*Polyporus circinans* is clearly an error for *P. circinatus.* Pennington's specimen is clearly to be referred to the latter species and it is so placed in the herbarium."

conglomeratus Peck, *Polyporus.* As reported in *N.Y.S. Mus. Rept.* 38:111. 1885 a typographical error for *P. glomeratus.*

connatus Schw., *Polyporus (Polystictus).* According to Lloyd (Lloyd *Letter* 50:5. 1913) the type specimen is *P. perennis,* but the name has been applied to *P. focicola* in the earlier American mycology. But CU specimen no. 20348 (Smithtown, L.I.) and Clearwater specimen (at CU) are *Fomes connatus;* specimen reported in *Torreya* 25:32. 1925 not examined.

dealbatus, Polyporus. CU no. 19860 (from Ithaca, N.Y.). Unknown to me, but scarcely the same as Ravenel's exisiccatae specimen (from South Carolina) in CU herb. (no. 836). Lloyd has placed with Ravenel's specimen a note reading, "small specimen but only collection known."

destructor Schrad., *Polyporus.* Reported in Lloyd *Letter* 61:1. 1916. The following description is adapted from Lloyd (7, p. 303).

Pileus effused-reflexed, watery, fleshy, drying soft and brittle; pores white, drying discolored brownish, small, round, fragile; spores elliptical, 4-5 × 3-3.5 μ.

Sent from New York State by F. H. Ames. "The main difference, by which the plant can be told from similar species, is the discoloring of the dried pores." (Lloyd)

elongatus Berk., *Polyporus.* Albany specimens are *P. pargamenus.*

epileucus Fries, *Polyporus.* Reported in edit. 1 on the basis of determinations by Lloyd. One specimen so reported appeared to be *Polyporus semisupinus.* The species is omitted in this edition because the identity of the plant under this name is unknown.

fibula, Polyporus. CU no. 2822. Spores not demonstrated; all other characters those of *P. galactinus.* Overholts (9, p. 52) says of *P. fibula* "now referred to *P. pubescens,* at least American specimens so determined."

hirsutellus, Polystictus. Reported in Lloyd *Letter* 69:10. 1919. Dr. John Stevenson writes of this specimen in the Lloyd Herbarium "*Polyporus hirsutellus*.... is in error for *P. hirsutulus* and the specimen..... is filed under the latter name."

holmiensis Fries, *Polyporus.* Reported in Lloyd *Letter* 67:3. 1918; described and figured in (7, p. 308, 309). Apparently a thick form of *P. fumosus* with dark lines running through the context.

intybaceus Fries, *Polyporus.* Specimens so reported are usually *P. frondosus.* The collection reported under this name by Kauffman in *N.Y.S. Mus. Bull.* 179:90. 1915 should be referred to *P. osseus.* Lloyd's note on this species based on Kauffman's specimen (Lloyd *Letter* 58:6. Note 276. 1915) thus rested upon a misconception, as was partly recognized by him in Lloyd *Letter* 60:9. Note 329. 1915.

labyrinthicus Fries, *Polyporus.* Reported by Peck on pine in *N.Y.S. Mus. Rept.* 22:82. 1869. Specimen not found at Albany. The species is considered to be a synonym of *P. obtusus* or perhaps of *P. delectans* by Lloyd (7, p. 381). Neither of these occur upon a coniferous substratum, however.

laceratus Berk., *Polyporus.* Albany specimens are *P. pargamenus.* Listed by Murrill (8, p. 27), and by Shope (19, p. 329) as a synonym of *P. pargamenus.*

Lloydii (Murr.) *Polystictus.* CU no. 18929. Collected on mine timbers, scarcely determinable. *P. Lloydii* is referred by Lloyd to *P. Grayii,* a synonym of *P. pubescens.*

ludovicianus (Pat.) Sacc. and Trott., *Polyporus.* Reported in Lloyd *Mycol. Notes* 64:1020. 1920. Listed by Lloyd (7, p. 381) as a synonym of *P. cuticularis.* See also Lloyd *Letter* 67:13. Note 661. 1918.

luridus Berk. and Curt., *Polyporus.* Collections so referred belong under *P. brumalis.* Listed as a synonym of *P. brumalis* by Lloyd (5, p. 178) and by Murrill (8, p. 56).

molliusculis Berk., *Polystictus.* CU no. 6. Misdetermination for *P. immitis. Coriolus molliusculis* (Berk.) Murr. in *Northern Polypores* (1914), p. 8 a change of name for *P. biformis.*

nigropurpurascens (Schw.), *Polyporus.* Change of spelling for *P. nigropurpurea.* Specimens at Albany and Buffalo variously referable to *P. dichrous* and to species of Poria. See Overholts' redescription of the types of this species in *Mycologia* 15:217. 1923.

niveus Fries, *Polyporus.* As reported in Saccardo *Syll. Fung.* 6:118. 1888 is a "lapsus" for "rutilans", according to Lloyd (7, p. 383).

oblectans Berk., *Polystictus.* Specimen at Albany is *P. cinnamomeus.* See discussion of this species in Lloyd's *Polyporoid Issue* No. 1, p. 7, footnote 10, 1908.

ochraceus, Polyporus, and form *albidus.* Lloyd's name for the light colored forms of *P. hirsutus.* See Lloyd *Letter* 49:12. Note 137. 1914.

Oerstedii Fries, *Polyporus.* Reported in Lloyd *Letters* 44:1. 1913; 45:1. 1913; and in 49:1. 1914. Each time indicated by him to be equal to *P.* (*Ganoderma*) *sessile.*

parvulus Klotzsch, *Polyporus.* According to Lloyd (*Polyporoid Issue* No. 1, p. 7. 1908) the type specimen is *P. cinnamomeus,* but in American mycology the name is usually applied to specimens of *P. focicola.* The Albany specimen is *P. focicola.*

perplexus Peck, *Polyporus.* The type collection has been lost. Usually considered synonymous with *P. cuticularis.* Lloyd (Lloyd *Letter* 39:7. 1912) believed the species distinct. Most collections so referred are *P. cuticularis* of this manual.

polycephalus Lloyd, *Polystictus cinnamomeus* var. Named and illustrated in Lloyd *Mycol. Notes* 71:1261 and *fig. 2761.* 1924. Apparently a form of *P. cinnamomeus* with branched stems and confluent pilei.

pseudopargamenus Thuem., *Polyporus.* Specimens at Albany so referred are *P. pargamenus.* Listed by Murrill (8, p. 27) and by Shope (19, p. 330) as a synonym of *P. pargamenus.*

rigens, Polystictus. Reported in Lloyd *Letter* 69:4. 1919. Sent by W. H. Ballou. In Saccardo *Syll. Fung.* 6:274. 1888 name used instead of *Trametes rigida* Berk. and Mont. Dr. John Stevenson writes from the Lloyd Herbarium "There are no specimens at this time in the Lloyd Herbarium under this name (*P. rigens*) or *Trametes rigida* from W. H. Ballou." *P. rigens* CU no. 2987 is *Trametes mollis.* See OBSERVATIONS under *Trametes rigida,* p. 101.

rubiginosus Rost., *Polyporus.* Reported by Peck in *N.Y.S. Mus. Rept.* 24:79. 1872. Not found at Albany. This species is placed in synonymy with *P. resinosus* Schrad. and the above report is cited as also belonging under *P. resinosus* in *Bull. Buffalo Soc. Nat. Sci.* 4:183. 1883.

salignus, Polyporus. Reported in Lloyd *Letter* 30:1. 1911. No specimens seen. According to Lloyd (7, p. 308) a form of *P. fumosus,* but in the report of this specimen the spores were recorded as "globose, 4-4½, hyaline, smooth." The spores of *P. fumosus* are cylindrical to cylindric-ellipsoid, 4.5-6 × 2-3 μ.

sartwellii Berk. and Curt., *Polyporus.* Described from a New York State specimen in *Grevillea* 1:51. 1872. Listed as a synonym of *P. pargamenus* by Murrill (8, p. 27) and by Shope (19, p. 330). Lloyd (Lloyd *Mycol. Notes* 32:423. 1909 says of a specimen in Fries' herbarium "it appears to me to be close to a *rigid* Daedalea unicolor except that the pores are polyporoid."

scruposus Fries, *polyporus.* CU no. 3381 and no. 5142 are forms of *P. gilvus* with rough upper surface.

setigera Peck, *Poria.* According to Overholts closely related to and probably a young stage of *Polyporus glomeratus.* See (11, p. 109, 110) and in *Mycologia* 23:128. 1931.

sinuosus Fries, *Polyporus.* Reported by Peck in *N.Y.S. Mus. Rept.* 40:54 (52). 1887. Specimen at Albany changed to *Poria sinuosa.* The specimen does not agree with the description (as Trametes) in Rea, *British Basid.*, p. 616. Unknown to me.

stipticus (Pers.), *Polyporus,* sense of Lloyd. Reported in Lloyd *Letter* 66:4. 1917. Another collection so referred in CU herbarium, no. 18153. Lloyd's specimens not seen. The following description is adapted from Lloyd (**7**, p. 321):

Pileus sessile, dimidiate, 1.5 × 3 × 4 (inches ?); surface white, dull, smooth, with no distinct crust; margin rufescent; context white, drying hard; tubes white, slightly rufescent on drying, 6-8 mm. long, mouths at first round, small, becoming larger and irregular when old; spores guttulate, elliptical and slightly curved, 3-4 × 1.5 μ.

On the wood of deciduous trees, reported on black oak, Orient, Long Island, Roy Latham (see *Torreya* 21:9. 1921). CU specimens fragmentary, not determinable.

A specimen in the herbarium of the New York Botanical Garden, from Europe and determined by Bresadola as *P. stipticus,* is very similar if not identical with *P. anceps* as described in this manual. Concerning Bresadola's conception of this species see Romell in *Svensk Botanisk Tidskrift* Bd. 20, Heft 1, p. 7. 1926.

subflavus Lév., *Polyporus. Ann. Sci. Nat. Bot.* III. 5:300. 1846. Type from New York State. Listed by Murrill (**8**, p. 27) and by Shope (**19**, p. 330) as a synonym of *P. pargamenus.*

subfuscus Fries, *Polyporus.* Reported in *N.Y.S. Mus. Rept.* 22:83. 1869. Not found at Albany. No description found under this name.

subpileatus, Polyporus. Reported and discussed by Lloyd in Lloyd *Mycol. Notes* 64:1019. 1920. In Fries' *Epicrisis,* p. 472, this species is placed between *P.* (*Fomes*) *annosus* and *P.* (*Fomes*) *connatus.* Lloyd's comments do not apply to such a species, but rather to one like *P. semipileatus.* Dr. John Stevenson writes of the specimen in the Lloyd Herbarium "... specimen ... under the name *P. subpileatus* is in the Lloyd Herbarium under that name. Lloyd used the name as it was written on the original label. ... From his comments on the specimen, however, I feel sure that he confused the name with *semisupinus* as you suggest." (Note: "semipileatus" was the name the writer intended to suggest. Lloyd considered *P. semipileatus* a synonym of *P. semisupinus.*)

sullivantii Mont., *Polyporus.* Reported by Peck in *N.Y.S. Mus. Rept.* 22:84. 1869. As stated by Lloyd (Lloyd *Mycol. Notes* 29:379. 1908) the Albany specimen is *P. pubescens.* Murrill (**8**, p. 19) lists *P. sullivantii* as a synonym of *P. pubescens.*

valenzuelianus Mont., *Polyporus.* Reported in Lloyd *Letter* 67:11. 1918. Not collected in the state. Dr. D. V. Baxter examined the specimen in the Lloyd Herbarium. The notes on the label within the packet read "This I think must be from the south. L. A. Zimm. Ithaca, N. Y. Col. in Louisiana" Lloyd).

weinmanni Fries, *Polyporus.* The writer would refer the collections at Albany as follows:

Bolton Landing collection = *P. fragilis*
Catskill Mts. collection = *P. mollis* (*P. Weinmanni* is a synonym of *P. mollis* according to Lloyd)
Floodwood collection = *P. ursinus*

Collection reported by Kauffman in *N.Y.S. Mus. Bull.* 179:90. 1915 now (correctly) referred to *P. ursinus* in MU herbarium.

FAVOLUS Fries

Fruiting body annual, epixylous, more or less stipitate, the stem typically lateral; pileus fleshy-tough when fresh, brittle when dry; context white; pore mouths more or less hexagonal, often radially elongated; cystidia none; spores hyaline.

Species of Polyporus with similar pores differ in having the stem central and well developed.

The genus is represented in New York State by only one species.

KEY TO THE SPECIES

1. Pores 0.5 mm. or more wide; tubes not waxy when fresh; hyphae 2.5-4 μ in diameter; spores 8-11 $\times$ 3-4 μ.....*95. F. alveolaris*
Pores 2-3 per mm.; tubes more or less waxy when fresh; hyphae 5-8 μ in diameter; spores 3.5-5 $\times$ 2-2.5 μ.....See *57. Polyporus rhipidium*

95. **Favolus alveolaris** (DC.) Quél.

F. canadensis Klotzsch; *F. europaeus* Fries; *F. microporus* (Murr.) Sacc. and D. Sacc.; *Hexagona alveolaris* (DC.) Murr.; *H. micropora* Murr.; *H. striatula* (Ell. and Everh.) Murr.

Stem lateral or reduced to a lateral tubercle, rarely excentric, not over 1 cm. long, 0.2-0.7 cm. thick; **pileus** fleshy-tough when fresh, drying brittle, reniform or flabelliform to circular, rarely somewhat infundibuliform, 2-5 $\times$ 2-8 $\times$ 0.2-0.8 cm.; surface at first reddish brown and innately fibrillose, becoming ochraceous to white, glabrous; margin thin to somewhat thickened, fertile below; **context** white, firm and fragile when dry, 0.5-2 mm. thick, the hyphae somewhat branched, thick-walled, 2.5-4 μ in diameter; **tubes** decurrent, sometimes to the base of the stem, at first white to light buff, drying somewhat darker, 1-5 mm. long, mouths concolorous, angular, four to six sided, usually radially elongate, 0.5-4 mm. long, 0.5-2 mm. wide, the edges thin, often torn, dentate; cystidia none; basidia 5-8 μ in diameter; **spores** hyaline, smooth, cylindrical, straight to slightly curved, apiculate, 8-11 $\times$ 3-4 μ.

On branches of hardwoods. Common. Spring and early summer.

Illustrations: Hard, Mushrooms, p. 429, *f. 359.* 1908 (as *F. canadensis*); Lloyd, Polyp. Issue 2:18, *f. 256* (as *F. europaeus*), and p. 19, *f. 257* (as *F. micro(s)porus*). 1909; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:158. *pl. 1, f. 6.* 1914 (as *F. europaeus*); Shope, Ann. Missouri Bot. Gard. 18:454. *pl. 38, f. 5.* 1931.

OBSERVATIONS

boucheanus Klotzsch, *Polyporus* (but authority Fries in Mus. Repts.). Reported by Peck in *N.Y.S. Mus. Rept.* 22:82. 1869 and discussed in *Rept.* 26:90. 1874. The collection was not found at Albany. Peck later referred this collection to *Favolus canadensis* (= *alveolaris*). See *Bull. Buffalo Soc. Nat. Sci.* 4:185. 1883.

TRAMETES Fries

Fruiting body usually annual, epixylous, sessile, effused-reflexed, or resupinate, corky, coriaceous, or rigid; context white, pinkish, or more or less brown; pore mouths circular to angular, sometimes daedaloid; tramal tissue continuous with the context, the tubes often sunken to uneven depths into the context; cystidia none, setae present or absent; spores hyaline.

As defined by Fries, the genus includes those species with pore mouths equal, circular to elongated, and with the substance of the trama continuous with the substance of the pileus. Other genera, however, exhibit these characters. It is often difficult to differentiate from Trametes certain species of Polyporus or of Fomes. Forms of species of Daedalea with circular pore mouths, or poroid forms of species of Lenzites, are sometimes confusing.

KEY TO THE SPECIES

1. Context pinkish to rose colored.....*102. T. subrosea*
   Context white, whitish, or buff..... 2
   Context light brown..... 11
   Context yellowish brown or darker..... 15

Context white or whitish

2. Fruiting body resupinate or nearly so..... 3
   Fruiting body effused-reflexed or sessile..... 5
3. Spores ovoid, 4.5-5 × 3.5-4.5 μ; pores 2-4 per mm.
   See *124. Fomes annosus*
   Spores cylindric-ellipsoid, 7-9 × 2-3 (4) μ; pores 2-3 per mm.,
   96. T. serialis
   Spores cylindrical to cylindric-ellipsoid; pores not less than 2 per mm. 4
4. Pores 1-3 mm. broad; spores 8-12 × 3.5-4.5 μ; on coniferous wood,
   98. T. heteromorpha
   Pores 1-2 per mm.; spores 8-11 × 3-4 μ; usually on deciduous wood .....*99. T. sepium*
   Pores 1-2 per mm.; spores 6-8 × 2.5-3 μ; usually on coniferous wood .....*97. T. variiformis*
5. Surface of the pileus distinctly brown..... 6
   Surface of the pileus white, whitish, buff, grayish, or brownish..... 7
6. Pores 1-2 per mm.; spores cylindrical to cylindric-ellipsoid,
   97. T. variiformis
   Pores 2-3 per mm.; spores cylindric-ellipsoid.....*96. T. serialis*
   Pores 2-4 per mm.; spores ovoid.....See *124. F. annosus*
7. Context 1-2 mm. thick or thinner..... 8
   Context typically 2 mm. or more thick, usually much thicker..... 10
8. Pores 1-3 mm. broad; on the wood of coniferous trees,
   98. T. heteromorpha
   Pores 1-3 per mm.; usually on the wood of deciduous trees..... 9
9. Pileus sessile or effused-reflexed; surface nearly glabrous, smooth; pores 1-2 per mm. .....*99. T. sepium*
   Pileus narrowly reflexed, sometimes entirely resupinate; surface coarsely hirsute or strigose; pores 2-3 per mm.....*103. T. morgani*
10. Pores 1-3 per mm.; pileus large, 3 cm. or more wide; on willow and poplar .....*101. T. suaveolens*
    Pores 4-6 per mm.; pileus large, 3 cm. or more wide; on locust only .....See *77. Polyporus robiniophilus*
    Pores 9-11 per mm.; pileus small, not over 2 cm. wide....*100. T. pusilla*

Context light brown or darker

11. Surface of the pileus hirsute or strigose..... 12
    Surface velvety to glabrous..... 13
12. Context 1 mm. or less thick; pores 2-3 per mm.; pileus narrowly reflexed, up to 1.5 cm. wide.....*103. T. morgani*
    Context 2-10 mm. thick; pores about 1 per mm.; pileus 2-5 cm. wide .....*104. T. hispida*

13. Context 2-5 mm. thick; surface light brown, darkening with age, azonate or nearly so ..... *105. T. malicola*
Context 1 mm. or less thick; surface light brown to dark brown, distinctly zonate 14
14. Pores 1-3 per mm. ..... *106. T. mollis*
Pores 5-6 per mm. ..... See *68. Polyporus planellus*
15. Setae present 16
Setae absent 17
16. Spores subglobose to globose, 4-5 μ; hyphae 3-5 μ in diameter, See *131. Fomes pini*
Spores cylindrical, 6-8.5 $\times$ 1.5-2 μ; hyphae 2.5-3 μ in diameter, *109. T. tenuis*
17. Context 0.5 mm. or less thick; fruiting body usually reflexed or resupinate; pores often hexagonal ..... *107. T. carbonaria*
Context 5-15 mm. thick; pileus sessile; pores angular to elongated or daedaloid ..... *108. T. americana*

I. Context white, whitish, or buff.
A. Surface of the pileus brown

96. **Trametes serialis** Fries

T. serialis resupinata Romell; *Coriolellus serialis* (Fries) Murr. in part.

Fruiting body effused-reflexed or often resupinate, coriaceous, laterally confluent, narrowly reflexed, 0-1 $\times$ 1-6 $\times$ 0.3-0.8 cm.; surface brown, appressed-tomentose to nearly glabrous, zonate; margin thin to thick, acute to obtuse; **context** white, corky, less than 1 mm. thick, the hyphae rarely branched, thick-walled, 2-5 μ in diameter; **tubes** white, 2-8 mm. long, mouths white or whitish, circular to angular, 2-3 per mm., the edges thick and entire, becoming thin and dentate with age; cystidia none; basidia 5-6 μ in diameter; **spores** hyaline, smooth, cylindric-ellipsoid, 7-9 $\times$ 2-3 μ.

On the wood of coniferous or rarely of deciduous trees. Frequent. Spring, summer, and fall.

Illustrations: Baxter, Pap. Michigan Acad. Sci., Arts, Lett. 27:162. *pl. 1, fig. 1* and *pl. 9*, 1942; Lloyd, Mycol. Notes 69: *pl. 235, f. 2393.* 1923; Shope, Ann. Missouri Bot. Gard. 18:438. *pl. 30, f. 3.* 1931; Snell, Mycologia 15:153. *pl. 16, f. 1-3.* 1923.

Type of rot: brown pocket rot, see Cartwright and Findlay, Principal Decays Softwoods Used in Great Britain, pp. 65-70. 1938; Hubert (3, p. 413); and Snell, Mycologia 15:158. 1923.

97. **Trametes variiformis** Peck

Polyporus variiformis Peck; *P. variiformis interruptus* Peck; *P. variiformis nodulosus* Peck; *P. variiformis resupinatus* Peck; *Coriolellus variiformis* (Peck) Murr. in part.

Fruiting body narrowly reflexed or often entirely resupinate, coriaceous, 0-1 $\times$ 1-5 $\times$ 0.2-0.6 cm.; surface brown, hirsute to nearly glabrous, zonate; margin obtuse to acute, fertile below; **context** duplex, the upper layer concolorous with the surface, lower layer white, 1 mm. or less thick, the hyphae of the lower

layer rarely branched, thick-walled, 3-6 μ in diameter; **tubes** white or whitish, 1-6 mm. long, mouths concolorous, angular to daedaloid, averaging 1-2 per mm., the edges thick, becoming incised with age; cystidia none; basidia 6-9 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 6-8 $\times$ 2.5-3 μ.

On the wood of coniferous trees. Uncommon. Summer and fall. When entirely resupinate compare *T. heteromorpha*. At times closely resembles *T. mollis*, but can be distinguished by the branching of the hyphae, the color of the context, and most easily by the color of the tubes.

Illustrations: Baxter, Pap. Michigan Acad. Sci., Arts, Lett. 21:268, *pl. 39*. 1936 and the same, vol. 27:162, *pl. 8* and *pl. 9*. 1942; Lloyd, Mycol. Notes 61: *pl. 128, f. 1521-1522*. 1919, and Notes 62: *pl. 149, f. 1698*. 1920; Shope, Ann. Missouri Bot. Gard. 18:438. *pl. 30, f. 4*. 1931.

B. Surface of pileus white, whitish, buff, or grayish (compare also 103. T. morgani).

98. **Trametes heteromorpha** (Fries) Lloyd

T. hexagoniformis (Murr.) Lloyd; *Polystictus heteromorpha* (Fries) Lloyd; *Lenzites heteromorpha* Fries; *Coriolus hexagoniformis* Murr.

Fruiting body effused-reflexed or more often resupinate, coriaceous to firm-corky, 0-2 $\times$ 1-5 $\times$ 0.2-1 cm.; surface white to buff, tomentose, zonate; margin obtuse, fertile below; **context** white to buff, 1 mm. or less thick, the hyphae rarely branched thick- to thin-walled, 3-5 μ in diameter; **tubes** white to buff, 0.2-1 cm. long, mouths concolorous, angular to daedaloid, 1-3 mm. broad, the edges rather thick, entire to lacerate; cystidia none; basidia 6-8 μ in diameter; **spores** hyaline, smooth, apiculate, cylindric-ellipsoid, 8-12 $\times$ 3.5-4.5 μ.

On the wood of coniferous trees. Rare. Fall. When entirely resupinate separable from *T. variiformis* only by the size of the pores.

Illustrations: Baxter, Papers Michigan Acad. Sci., Arts, Lett. 21:268, *pl. 36*. 1936 and the same, vol. 27:162, *pl. 10* and *11*. 1942; Lloyd, Mycol. Notes 59:848. *f. 1115*, p. 849, *f. 1116-1119*. 1919; Shope, Ann. Missouri Bot. Gard. 18:440. *pl. 31, f. 2*. 1931.

Type of rot: brown cubical rot of coniferous wood, see Hubert (3, p. 416).

99. **Trametes sepium** Berk.

Coriolellus sepium (Berk.) Murr.

Fruiting body sessile or effused-reflexed, sometimes resupinate, corky, 0-1 $\times$ 1-3 $\times$ 0.2-0.7 cm.; surface white or whitish, nearly glabrous, azonate to faintly zonate; margin acute, fertile below; **context** white, 1 mm. or less thick, the hyphae rarely branched,

thick-walled, 2-5 μ in diameter; **tubes** white to pallid, 2-5 mm. long, mouths concolorous, circular to slightly sinuous, averaging 1-2 per mm., the edges moderately thick, entire; cystidia none; basidia 6-8 μ in diameter; **spores** cylindrical to cylindric-ellipsoid, 8-11 $\times$ 3-4 μ.

On the wood of deciduous or rarely of coniferous trees. Rather common. Summer and fall.

Compare *T. heteromorpha.*

Illustrations: Lloyd, Mycol. Notes 59:850. *f. 1120*, and *f. 1121* (as *T. minima*) 1919; Overholts, Wash. Univ. Studies 3:96. *pl. 7, f. 39, a-c.* 1915.

Type of rot: brown crumbly rot of the wood of deciduous trees, see Hubert, (3, p. 411).

100. Trametes pusilla Lloyd

Pileus sessile, soft-corky, dimidiate, convex to ungulate, 0.5-1.5 $\times$ 0.8-2 $\times$ 0.2-0.5 cm.; surface grayish, dull, minutely pubescent, azonate; margin rather thin, acute, sterile below; **context** white to pallid, usually duplex, a thin soft spongy layer above, within rather hard, slightly zonate, 1-4 mm. thick, the hyphae of the inner portion rarely branched, thick-walled, 3-6 μ in diameter; **tubes** white, 1 mm. or less long, mouths white to cream color or tinted with brown or reddish on drying, circular to angular, averaging 9-11 per mm.,[1] the edges moderately thick, entire; cystidia none; basidia not observed; **spores** "hyaline, smooth, cylindric, 6 $\times$3 μ" (Lloyd).

On the wood of deciduous trees, recorded only on white oak. Very rare, one collection known, Long Island, Roy Latham. The above description is based upon two specimens from Mr. Latham's collection.

Illustrations: Lloyd, Mycol. Notes 54:774. *f. 1165.* 1918.

101. Trametes suaveolens (L.) Fries

Pileus sessile, coriaceous to corky, fragrant when fresh, 3-10 $\times$ 5-15 $\times$ 1-5 cm.; surface white to yellowish or grayish, villous-tomentose to glabrous, azonate; margin acute to obtuse, usually sterile below; **context** white or whitish, corky, 0.5-2.5 cm. thick, the hyphae thick-walled, variable in size, 3-12 μ in diameter, the smaller often branched, the larger rarely branched; **tubes** concolorous, sometimes stratified, 0.3-2 cm. long, mouths white to dark colored, circular to slightly angular, averaging 1-3 per mm., the edges thick, entire; cystidia none; basidia 6-8 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, rarely subfusiform, 9-12 $\times$ 3-4 μ.

On the wood of living or dead willows, rarely on poplar. Spring, summer, and fall. Common.

[1] In the illustration of the type of this species (Lloyd's *Mycol. Notes* 54:774, *fig. 1165.* 1918) the pores appear somewhat larger, about 4-5 per mm.

Illustrations: Hirt, N.Y.S. Coll. Forestry Tech. Publ. 37: *pl. 7, f. 68.* 1932; Hubert, Outl. For. Path. p. 412, *f. 128.* 1931; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:160. *pl. 2, f. 9.* 1914.

Type of rot: white heartrot of willow, see Hirt, N.Y.S. Coll. Forestry Tech. Publ. 37. 1932 (biology).

II. Context pinkish to rose colored (compare also 17. Polyporus cinnabarinus).

102. Trametes subrosea Weir

Trametes (Fomes) carnea (Nees) of American writers, not Cooke; *Fomes carnea subzonata* Peck; *F. carnea granularis* Peck

Pileus sessile or effused-reflexed, coriaceous to rigid, conchate to applanate, rarely thicker, 1-5 × 2-7 × 0.3-0.7 cm.; surface pinkish to rose colored, becoming grayish to black with age, at first velvety-tomentose, becoming radially appressed-fibrillose to nearly glabrous, sometimes scabrous with minute tufts of short erect hairs, zonate to azonate; margin thin, sterile below; **context** pinkish to rose colored, corky, indistinctly zonate, 2-5 mm. thick, the hyphae rarely branched, thick-walled, 3-5 μ in diameter; **tubes** concolorous, white lined, 0.5-3 mm. long, mouths pinkish or rosy, circular to slightly angular, averaging 3-5 per mm., the edges moderately thick, entire; cystidia none; basidia 4-6 μ in diameter; **spores** hyaline, smooth, cylindrical, sometimes allantoid, 5-8 × 1.5-2.5 μ.

On the wood of coniferous or rarely of deciduous trees. Common. Summer and fall. The taxonomy of the species is discussed by Weir in *Rhodora* 25:214-220. 1923, and the physiology and cultural differences by Snell *et al.* in *Mycologia* 20:276-291. 1928, and by Mounce and Macrae in *Canadian Jour. Res.* 15:154-161. 1937. Overholts (**14**, p. 11) places this plant in the genus Fomes.

Illustrations: Lloyd, Synop. Genus Fomes, p. 224, *f. 577.* 1915 (as *Trametes carnea*); Overholts, Wash. Univ. Studies 3:98. *pl. 8, f. 41, a-b.* 1915 (as *T. carnea*); Shope, Ann. Missouri Bot. Gard. 18:442. *pl. 32, f. 1.* 1931; Zeller, Jour. Agr. Research 33:688. *f. 1.* 1926.

Type of rot: brown rot, see Hubert (**3**, pp. 384-386); Snell, Mycologia 15:158, 159. 1923; Korstian and Brush, U.S.D.A. Tech. Bull. 251, p. 14. 1931; and Zeller, Phytopathology 11:105. 1921, and Jour. Agr. Research 33:687-693. 1926.

III. Context light brown.

103. Trametes morgani Lloyd

Funalia rigida (Berk. and Mont.) H. D. House in part, not *Coriolopsis rigida* (Berk. and Mont.) Murr.

Fruiting body effused-reflexed or resupinate, usually by far the greater part resupinate, corky, the reflexed part up to 1.5 cm.

wide, 0.2-0.3 cm. thick; surface when present pale reddish or pale brownish, coarsely hirsute or strigose; margin thin, fertile below; **context** white to light brown, 1 mm. or less thick, the hyphae rarely branched, thick-walled, 3-6 μ in diameter; **tubes** concolorous with the context, 1-2 mm. long, mouths whitish to light brown, circular to angular, averaging 2-3 per mm., the edges rather thin, entire; cystidia none; basidia not observed; **spores** "12 $\times$ 6 μ" (Lloyd).

On the wood of deciduous trees, recorded only on poplar. This species has been confused with *T. hispida* and with *T. rigida* Berk. and Mont. The latter is a southern species of quite different appearance, see page 92.

Illustrations: Baxter, Pap. Michigan Acad. Sci., Arts, Lett. 25:170. *pl. 1.* 1940.

104. **Trametes hispida** Bagl.

T. peckii Kalchbr.; *Funalia stuppea* (Berk.) Murr.; *F. rigida* (Berk. and Mont.) H. D. House in part.

Pileus sessile or effused-reflexed, corky, imbricate, 2-5 $\times$ 3-10 $\times$ 0.3-2 cm.; surface yellowish brown to dark brown, densely and coarsely hirsute or strigose, azonate to zonate; margin acute to obtuse, fertile below; **context** light brown, corky, 0.2-1 cm. thick, the hyphae thick-walled, hyaline or somewhat brownish under the microscope, the darker rarely branched, 5-8 μ in diameter, the hyaline hyphae often branched, 2-4 μ; **tubes** concolorous, sometimes pallid within, 2-10 mm. long, mouths grayish brown or darker, angular to irregular, averaging about 1 per mm., the edges thin to moderately thick, entire to shallow-incised; cystidia none; basidia 7-9 μ in diameter; **spores** hyaline, smooth, cylindrical, 12-15 $\times$ 3.5-5 μ.

On the wood of deciduous trees. Apparently rare. According to Overholts (**9**, p. 69) occurs on willows, poplars, and cottonwoods.

Illustrations: Overholts, Wash. Univ. Studies 3:98. *pl. 8, f. 11, a-b.* 1915 (as *T. peckii*); Shope, Ann. Missouri Bot. Gard. 18:440. *pl. 31, f. 3.* 1931; Smith, Mycologia 22:222. *pl. 26.* 1930.

Type of rot: white spongy rot of deciduous trees, see Hubert (**3**, p. 411); and Smith, Mycologia 22:221-222. 1930.

105. **Trametes malicola** Berk. and Curt.

Coriolellus malicola (Berk. and Curt.) Murr.

Fruiting body sessile, effused-reflexed, or resupinate, corky, 0-2 $\times$ 1-5 $\times$ 0.3-1 cm.; surface light brown, in age sometimes dark gray behind, when young slightly velvety, at least in part, becoming glabrous or nearly so, azonate or faintly zonate; margin acute, sterile below; **context** light brown, corky, 2-5 mm. thick, the hyphae rarely branched, thick-walled, 3-5 μ in diameter; **tubes**

concolorous, sometimes in two or three layers, 2-5 mm. long, mouths light brown, circular to angular or sinuous, averaging 1.5-2 per mm., the edges becoming rather thin, entire; cystidia none; basidia 5-7 μ in diameter; **spores** hyaline, smooth, apiculate, cylindrical, 7-10 $\times$ 3-4 μ.

On the wood of deciduous trees and on cut timber. Frequent. This species is often confused with *T. sepium*, which sometimes discolors to brownish in age, but is never as truly brownish as *T. malicola*. Number 4295, Fungi Columbiana, is considered as representative of *T. sepium*.

Illustrations: Overholts, Wash. Univ. Studies 3:98. *pl. 8, f. 43, a-b*. 1915.

Type of rot: brown spongy rot of the wood of deciduous trees, see Hubert (**3**, p. 411).

106. **Trametes mollis** (Sommerf.) Fries

Antrodia mollis (Sommerf.) Karst.; *Trametes cervina* (Pers.) Lloyd.

Fruiting body effused-reflexed or resupinate, coriaceous, 0-2 $\times$ 1-6 $\times$ 0.2-0.5 cm.; surface dark brown, velvety to nearly glabrous, zonate; margin thin to thick, acute to obtuse, sterile or fertile below; **context** 1 mm. or less thick, duplex, light brown next the tubes, separated from the darker portion above by a thin black line, the hyphae from next the tubes usually much branched, thick-walled, 1-3 μ in diameter; **tubes** concolorous or somewhat darker, 1-4 mm. long, mouths grayish to brown, subcircular to angular or sinuous, averaging 1-3 per mm., the edges thin to rather thick, frequently incised; cystidia not observed; basidia 6-7 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 8-10 $\times$ 3-4 μ.

On the wood of deciduous[1] trees. Frequent. Summer and fall.

Shope (**19**, p. 367) uses the name *T. stereoides* (Fries) Bres. for this species. The writer prefers the name *T. mollis* because of the confusion which exists in Europe concerning the identity of the Friesian species. See Romell in *Arkiv för Botanik* Band 11, No. 3, pp. 23, 24. 1911, Lloyd *Letter* 63:14. Note 501. 1916, Bresadola in *Atti Accad. Rovereto* III 3:92. 1897, and Baxter, Pap. Michigan Acad. Sci., Arts, Lett. 24:185. 1939.

Illustrations: Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:162. *pl. 3, f. 14, a-b*. 1914 (as *T. stereoides*); Overholts, Wash. Univ. Studies 3:98. *pl. 8, f. 42*. 1915; Shope, Ann. Missouri Bot. Gard. 18:440. *pl. 31, f. 1*. 1931 (as *T. stereoides*).

IV. Context yellowish brown or darker.

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[1] Kauffman's specimens recorded on coniferous logs (*N.Y.S. Mus. Bull.* 179:91. 1915) should be referred to *Trametes variiformis*.

107. Trametes carbonaria (Berk. and Curt.) Overh.

T. sequoiae Copel.; *Coriolellus sequoiae* (Copel.) Murr.; *Hexagona carbonaria* Berk. and Curt.

Fruiting body effused-reflexed or resupinate, rarely sessile, coriaceous, more or less separable, **pileus** narrowly reflexed, or sessile and conchate, 0-1 × 1.5-8 × 0.15-0.3 cm.; surface light brown, very minutely tomentose, faintly zonate; margin obtuse, fertile below; **context** yellowish brown, soft spongy to leathery, very thin, inconspicuous, 0.5 mm. or less thick, the hyphae rarely branched, thick-walled, 2-3 μ in diameter; **tubes** concolorous, the walls whitish pruinose within, 1.5-3 mm. long, mouths grayish brown, usually more or less hexagonal, on inclined surfaces the dissepiments breaking down and the mouths becoming somewhat sinuous, averaging 2 per mm., the edges thin, entire; cystidia or setae none; basidia 5-7 μ in diameter; **spores** hyaline, smooth, allantoid, 7-9 × 2.5-3 μ.

On burnt wood of coniferous trees, recorded only on hemlock. The only certain collection is no. 8246, Varna, on burnt wood of hemlock stump, collected by Van Hook and deposited in the Atkinson Herbarium at Cornell University. No specimens were found at Albany. Rare. Fall.

108. Trametes americana Overholts

T. odorata (Wulf.) Fries and *T. protracta* Fries of most American determinations; *Gloeophyllum hirsutum* (Schaeff.) Murr. in part.

Pileus sessile, coriaceous to rigid, 2-5 × 4-15 × 0.5-2 cm.; surface yellowish brown to nearly black, sometimes grayish with age, glabrous or nearly so, zonate or sulcate; margin obtuse, sterile below; **context** yellowish brown to rusty brown, azonate to indistinctly zonate, 0.5-1.5 cm. thick, the hyphae rarely branched, rather thin-walled, 3-6 μ in diameter; **tubes** concolorous, gray within, 5-10 mm. long, mouths dark brown to pallid, angular to elongated or daedaloid, averaging 1-2 per mm., the edges becoming thin, entire; cystidia or setae none; basidia 5-8 μ in diameter; **spores** smooth, hyaline, apiculate, cylindrical to cylindric-ellipsoid, 8-12 × 2.5-5 μ.

On the wood of coniferous trees, and on cut timber. It is distinct from *Lenzites sacpiaria* and *L. trabea* in culture, according to Mounce and Macrae (*Canadian Jour. Res.* 14:215-221. 1936). Uncommon. Summer.

Illustrations: Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:160. *pl. 2, f. 10, a-c.* 1914; Shope, Ann. Missouri Bot. Gard. 18:440. *pl. 31, f. 4.* 1931.

109. Trametes tenuis Karst.

Fomes tenuis Karst.

Fruiting body narrowly reflexed or more often resupinate, rarely sessile, conchate to convex, coriaceous to woody, insep-

arable, 0-1.5 × 1-10 × 0.1-0.6 cm.; surface reddish brown, in age weathering to grayish black, velvety-tomentose or in age becoming more or less glabrous, zonate; margin usually acute, lighter colored, narrowly sterile below, when resupinate narrowly sterile and velvety-tomentose, or fertile to the margin; **context** yellowish brown to reddish brown, 0.5-1 mm. thick, the hyphae rather thin-walled, rarely branched, 2.5-3 μ in diameter; **tubes** cinnamon brown to yellowish brown, usually grayish within, 0.5-5 mm. long, mouths concolorous, circular to elongated, the dissepiments sometimes breaking down to form elongated and sinuous pores, averaging 2-4 per mm., the edges moderately thick to thin, entire; **setae** abundant, subulate, 5-8 μ in diameter, projecting up to 40 μ; basidia 3.5-4 μ in diameter; **spores** hyaline, smooth, cylindrical, 6-8.5 × 1.5-2 μ.

On the wood of coniferous and deciduous trees. Summer and fall, or sometimes persisting. Specimens under the name of *Poria viticola* (Schw.) Cooke must be carefully studied before accurate distribution records can be given.

Overholts (*Mycologia* 23:128. 1931) lists *Poria viticola*, *Trametes setosus* Weir, and *Poria superficialis* (Schw.) Cooke as synonyms of *T. tenuis*. Baxter (Pap. Michigan Acad. Sci., Arts, Lett. 22:292. 1937), Bresadola (*Ann. Mycol.* 18:62. 1920), Bourdot and Galzin (**1**, p. 622) and Shope (**19**, p. 363) list *T. (Fomes) tenuis* as a synonym of *T. (Phellinus) isabellina* Fries. The writer has seen no authentic specimens of the latter species.

Illustrations: Shope, Ann. Missouri Bot. Gard. 18:438. *pl. 30, f. 1-2.* 1931 (as *T. isabellina*).

OBSERVATIONS

callosa (Fries) Sacc., *Poria*. Generally considered to be the resupinate form of *T. serialis*.

hydnoides Fries, *Trametes*. Twice reported by Peck, but no specimens found at Albany. A tropical species easily recognized by its applanate habit, brown color throughout, and the thick covering of rigid branched fibers on the surface.

merisma Peck, *Trametes*. Known only from the type collection on beech, Fine, C. H. Peck. The original specimens are sterile and the plant is considered to be an abnormal growth of some species of Polyporus, near *P. pubescens* or *P. hirsutus*.

quercina Lloyd, *Trametes*. Lloyd *Mycol. Notes* 64:1019. 1920. Specimen collected in Michigan. Described in Lloyd *Mycol. Notes* 66:1114. 1922.

rigida Berk. and Mont., *Trametes*. This species has been confused with *T. morgani* and with *T. hispida*. No New York State collections have been seen which correspond to the specimens referred to *T. rigida* Berk. and Mont. in the herbarium of the New York Botanical Garden, identified by Dr. Murrill. *T. rigida* is quite distinct from *T. morgani* or *T. hispida* as the upper surface is covered with fine, *soft, closely appressed* fibrils.

serpens Fries, *Trametes*. Collections at Albany do not have hpyhal pegs, the outstanding character of the species (see Overholts, **12**, p. 1702). Probably resupinate specimens of other species of Trametes (Indian Lake and Kirkville specimens—*T. variiformis*?; Osceola specimen—*T. serialis*?).

Lloyd (*Mycol. Notes* 59:851 and *figs. 1422-1424.* 1919) comments on this species, "In the north, ..., it forms little patches." The writer has examined two specimens so determined by Lloyd (col. L. H. Pen-

nington, see Lloyd *Mycol. Notes* 64:1019. 1920; Univ. of Mich. herb. col. A. H. Povah, Vermilion, Mich. "Of American mycology, but doubtful whether that of Europe. Lloyd." Det. J. R. Weir as "*Poria papyracea* (Schw.) Cooke, see *Phytopathology* 13:187. 1923). These specimens agree exactly with a specimen determined as *Poria papyracea* by Dr. L. O. Overholts. It seems probable, therefore, that Lloyd's comments on specimens collected in the northern United States apply to *Poria papyracea*. The two species present almost exactly the same external appearance; they differ thus:

Poria papyracea	*Trametes serpens*
Spores slightly roughened, sometimes appearing longitudinally striate	Spores reported to be smooth
Hyphal pegs absent	Hyphal pegs easily visible with a 14x handlens

stephensii Berk. and Broome, *Trametes (Polyporus)*. Said to be a synonym of *T. serpens*, which see.

trogii Berk., *Trametes*. Peck's determinations here included under *T. morgani* and *T. hispida*.

DAEDALEA (Pers.) Fries

Fruiting body annual or persisting for two or three years, epixylous, sessile or effused-reflexed, coriaceous, corky, or rigid; context white to light brown; trama continuous with or at least not sharply distinct from the context; hymenial configuration typically daedaloid, varying to lamellate or irpiciform, or pore mouths circular; cystidia none; spores hyaline.

The daedaloid pore surface is the distinguishing character of the genus. The species are very variable. Poroid forms may easily be confused with Trametes, lamellate forms with Lenzites, or *D. unicolor* with the thin coriaceous species of Polyporus.

KEY TO THE SPECIES

1. Pores 1 per mm. or larger, the edges thick and obtuse; pilei usually large and thick 2
   Pores usually smaller, or if 1 mm. or more broad, the edges thin and acute; pilei thin 3
2. Growing on the wood of various deciduous trees, especially oak, *110. D. quercina*
   Growing only on the wood of red cedar ..... *111. D. juniperina*
3. Surface of the pileus villous or hirsute ..... *114. D. unicolor*
   Surface glabrous or nearly so 4
4. Context white; pores 2-3 per mm.; hyphae 3-5 μ in diameter, *113. D. ambigua*
   Context whitish to light brown; pores 0.5-1.5 mm. broad; hyphae 4-8 μ in diameter ..... *112. D. confragosa*

110. **Daedalea quercina** (L.) Fries

Pileus sessile, corky, convex, 3-10 × 4-15 × 2-5 cm.; surface white or grayish to almost black, glabrous, azonate; margin usually thick and obtuse, sterile or fertile below; **context** pallid to light brown, corky, zonate, 0.5-2 cm. thick, the hyphae rarely branched, usually thick-walled, 3-6 μ in diameter; **tubes** concolorous, 1-3 cm. long, usually whitish within, mouths whitish to dark

brown, daedaloid or lamellate, 1 mm. or more broad, the edges thick, obtuse; cystidia scarcely projecting, inconspicuous, 3-4.5 μ in diameter; basidia 5-8 μ in diameter; **spores** "cylindric, smooth, hyaline, 5-6 $\times$ 2-3 μ" (Overholts).

On old logs and stumps of deciduous trees, rarely on cut timber. Common. Summer and fall.

Illustrations: Cartwright and Findlay as below, *pl. 12;* Hard, Mushrooms, p. 428, *f. 357.* 1908; Marshall, Mushroom Book, p. 114. 1905; Meinecke, Man. Forest Tree Dis. *pl. 2.* 1914; von Schrenk and Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull. 149: *pl. 10, f. 1.* 1909.

Type of rot: white rot of the heartwood of oaks and chestnut, see Cartwright and Findlay, Principal Rots English Oak, pp. 24-26. 1936; Hubert, (**3**, p. 413); and von Schrenk and Spaulding, (**17**, p. 61).

111. **Daedalea juniperina** Murr.

Pileus sessile, corky to rigid, often imbricate, ungulate, 2-7 $\times$ 2-8 $\times$ 1-3 cm.; surface whitish to grayish, or blackish at the base, finely tomentose to glabrous, azonate; margin rather thick, fertile below; **context** white to pallid, punky to soft-corky, 0.5-1 cm. thick, the hyphae rarely branched, usually thick-walled, 3-6 μ in diameter; **tubes** concolorous with the context, 0.5-2 cm. long, mouths usually becoming more or less lamellate, 1 mm. or more broad, the edges usually thick and obtuse, sometimes becoming thin; cystidia none; basidia not observed; **spores** "cylindric, smooth, hyaline, 6-8 $\times$ 2.5-3.5 μ" (Overholts).

On the wood of red cedar. Very rare, one collection only recorded, W. H. Ballou. The species is very close to *D. quercina*, differing chiefly in its substratum.

112. **Daedalea confragosa** (Bolt.) Fries

Trametes rubescens (Alb. and Schw.) Fries

Pileus sessile, leathery to frigid, usually applanate, 2-10 $\times$ 3-15 $\times$ 0.3-2 cm.; surface grayish to brownish, glabrous or nearly so, zonate; margin thin, fertile below; **context** whitish to light brown, floccose to corky, 0.2-1 cm. thick, the hyphae rarely branched, thick-walled, 4-8 μ in diameter; **tubes** somewhat lighter colored than the context, 0.1-1.5 cm. long, mouths whitish, cinereous, or flesh colored, darker where bruised, subcircular to daedaloid or radially elongated, sometimes becoming lamellate in old specimens, 0.5-1.5 mm. broad, the edges becoming thin, entire to dentate or becoming incised; cystidia none but hyaline or slightly colored branched paraphyses abundant, projecting between and beyond the basidia, 2.5-4 μ in diameter; basidia 6 μ in diameter; **spores** hyaline, smooth, cylindrical or allantoid, 6-7 $\times$ 2 μ.

On the wood of deciduous or rarely of coniferous trees, or on

living trees. Common. Summer and fall. A very variable species with many confusing forms.

Illustrations: Campbell as below, p. 976. Hard, Mushrooms p. 422, *f. 351*, and p. 423, *f. 352* (as *Trametes rubescens*), also p. 429, *f. 358*. 1908; Lloyd, Mycol. Notes 72: *pl. 285*, *f. 2792*. 1924; Moffatt, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 18*. 1909; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:162. *pl. 3*, *f. 12*, *a-g*. 1914; White, Connecticut Geol. and Nat. Hist Surv. Bull. 3:62, *pl.* 34. 1905.

Type of rot: white mottled rot of deciduous wood, see Hubert, (3, p. 413); causing cankers, see Campbell, Jour. Forestry 37:974-977. 1939.

113. **Daedalea ambigua** Berk.

D. Aesculi (Schw.) Murr.; *D. glaberrima* Berk. and Curt.

Pileus sessile though sometimes appearing substipitate or tuberculate-sessile, corky to rigid, applanate, 5-12 × 5-20 × 0.5-1.5 cm.; surface white, sometimes darkening at the base, glabrous or nearly so, azonate or nearly so; margin thin, narrowly sterile below; **context** white, floccose-punky to corky, 0.2-1 cm. thick, the hyphae thick-walled, of two kinds, some rarely branched, 4-5 μ in diameter, others much branched, 3-4 μ; **tubes** concolorous, 2-4 mm. long, mouths white to yellowish, circular to daedaloid, averaging 2-3 per mm., the edges thick, entire; cystidia none; "branched paraphyses sometimes present" (Overholts); basidia 4-5 μ in diameter; **spores** hyaline, smooth, cylindrical, 5-6 × 2.5 μ.

On the wood of deciduous trees. Reported erroneously in edit. 1, as it has not yet been collected in the state. It is known to occur in neighboring states and should be looked for near the southern and western borders of our state. The above spore measurements may not represent the maximum size or variation attained by this species, as only a few attached spores were seen. The spores are cylindrical rather than globose, 2-3 μ, as is stated by Murrill (*No. Amer. Flora* 9:126. 1908).

Illustrations: Hard, Mushrooms, p. 427, *f. 355-356*. 1908.

114. **Daedalea unicolor** (Bull.) Fries

D. unicolor var. *fumosa* Peck; *D. ochracea* sense of Lloyd; *Cerrena unicolor* (Bull.) Murr.

Pileus sessile or effused-reflexed, coriaceous, 0.5-5 × 2-10 × 0.2-0.5 cm.; surface white to grayish or brownish, villous or hirsute, zonate; margin thin, sterile below; **context** white to pallid, corky, 1 mm. or less thick, the hyphae rarely branched, thick-walled, 3-5 μ in diameter; **tubes** concolorous with the context or more often darkening, 1-4 mm. long, mouths white to cinereous or dark brown, daedaloid at first, soon breaking up into teeth, but remaining daedaloid at the margin, averaging 2 per mm.; cystidia none;

basidia 4-5 μ in diameter; **spores** hyaline, smooth, cylindric-ellipsoid to ellipsoid, 5-6 $\times$ 2.5-3.5 μ.

On the wood of deciduous or rarely of coniferous trees. Common. Spring, summer, and fall.

Illustrations: Moffatt, Bull. Nat. Hist. Surv. Chicago Acad. Sci. 7, I: *pl. 17, f. 2.* 1909; Murrill, Mycologia 10:107. *pl. 6, f. 6.* 1918; Overholts, Wash. Univ. Studies 3:98. *pl. 8, f. 45, a-b.* 1915.

OBSERVATIONS

albida Fries, *Lenzites.* Reported in *Torreya* 21:10. 1921. Here a form of *D. confragosa.*

bicolor Fries, *Lenzites.* Specimen at Buffalo so referred is *D. confragosa.*

cinerea Fries, *Daedalea.* Reported by Peck in *N.Y.S. Mus. Rept.* 22:84. 1869. Specimens at Albany are *D. unicolor.*

concolor, Daedalea. CU no. 5498. Weathered specimens of *D. unicolor,* at least in part.

confragosa, Lenzites. Reported in Lloyd *Mycol. Notes* 65:1077. 1921. Dr. John Stevenson writes of this in the Lloyd Herbarium "the ...specimen... is in the herbarium under the Lenzites name, but with a note to the effect that it is merely a lenzitoid form of *Daedalea confragosa.*"

confragosa, Trametes. Reported in Lloyd *Mycol. Notes* 67:1161. 1922 and in Lloyd *Letter* 30:1. 1911. Dr. John Stevenson writes from the Lloyd Herbarium "...the Ames specimen listed by you is not found in the herbarium but on other specimens referred to this species Lloyd notes that "it is only a trametoid form of *Daedalea confragosa.*"

crataegi Berk., *Lenzites.* Specimens so referred are *D. confragosa.* Listed as a synonym of *D. confragosa* by Murrill (**8**, p. 126).

extensa Peck, *Daedalea.* Described by Peck in *N.Y.S. Mus. Rept.* 44:133 (21). 1892. The original description follows: "Resupinate, thick, coriaceous, often uneven or somewhat nodulose, the margin at first cottony and white, soon changing to brown, the subiculum slightly rufescent; pores large, unequal and labyrinthiform, in vertical places oblique, whitish; spores minute, oblong, .00024 to .0003 in. long, .0001 to .00012 broad.[1]

"Prostrate trunks of deciduous trees. Salamanca. September.

"This forms patches two feet or more in length on the sides and lower surface of the trunk. It follows the inequalities of the surface, and in vertical places it becomes more or less nodulose or develops a thick obtuse margin, which is velvety-tomentose and at length dark-brown in color, but I have seen no reflexed margin. It is suggestive of resupinate forms of *Trametes mollis* but differs from it in the character of the pores, in the thicker subiculum, and in the absence of any free margin."

Overholts (**11**, p. 77) writes "It is quite probable that the species will never be recognized from the above (i.e. Peck's) description alone. The description reads somewhat like one of the resupinate forms of *Trametes serialis* Fries, in which the hymenium had become lacerated and torn. The writer has seen from one of the New England States (New Hampshire) specimens of *Trametes mollis* B. & C. that would also answer the description fairly well."

The type collection at Albany consists of two or three small pieces. The hymenial surface is now a cinnamon brown and the pores are hardly evident, their presence perhaps suggested by projections of the tissue around grass stems and other foreign material. The subiculum is nearly concolorous with the hymenial surface, is 0.5-1.5 mm. thick, and the hyphae are thick-walled, somewhat branched, 6-10.5 μ in diameter. Cystidia, basidia, or spores were not observed.

[1] Expressed in microns 6-7.5 $\times$ 2.5-3 μ.

Murrill (*Mycologia* 12:110-111. 1920) reports an Indiana collection which corresponds to Peck's description.

The writer has examined a specimen in the herbarium of Dr. D. V. Baxter. It was determined by Dr. J. R. Weir who states that it is the same as Murrill's plant. Dr. Baxter's specimen agrees in general with Peck's description. A description of Dr. Baxter's specimen follows:

Fruiting body resupinate but with abortively formed pilei which are brownish and almost glabrous on the upper surface, effused up to 5 cm. in extent, coriaceous, apparently inseparable; subiculum very light brown, corky, about 1 mm. thick, the hyphae often branched, thick-walled, up to 8 μ in diameter, sometimes more; tubes ochraceous to light brown, up to 4 mm. long, mouths 1-1.5 per mm., the dissepiments thin, incised, and the pore surface appearing irregularly toothed; cystidia not observed; basida 6 μ broad; spores hyaline, smooth, apiculate, cylindrical, 7.5-9 $\times$ 2.5 μ.

klotzschii Berk., *Lenzites.* Albany specimen is *D. confragosa.* Listed as a synonym of *D. confragosa* by Murrill (**8**, p. 126).

ochracea, Daedalea, and form *albida.* Lloyd's name for the light colored forms of *D. unicolor.*

plumbea Lév., *Daedalea. Ann. Sci. Nat. Bot.* III 5:302. 1846. Based on a collection from Long Island. Listed by Murrill (**8**, p. 125) as a doubtful synonym of *D. quercina.* The description is inadequate to certainly place the species.

sulphurella Peck, *Daedalea. N.Y.S. Mus. Rept.* 44:133 (21). 1892. According to Overholts who has worked over what remains of the type material the affinities of this species appear to be with the Hydnaceae rather than with the Polyporaceae. See Overholts' redescription (**11**, pp. 118-120).

tricolor, Lenzites. Specimen in Buffalo Museum (no. 44452) is *D. confragosa.*

LENZITES Fries

Fruiting body usually annual, epixylous, sessile, or effused-reflexed, coriaceous to rigid; context white or brown; substance of the trama continuous with the context; hymenial configuration usually lamellate, if poroid, the pores usually radially elongated, or often daedaloid; cystidia present or absent; spores hyaline.

The genus is distinguished from Daedalea by the more lamellate pore surface, but every intermediate or even typically daedaloid pore configuration will be encountered. The lamellate condition of this genus connects the family Polyporaceae with the family Agaricaceae.

KEY TO THE SPECIES

1. Context white; surface of the pileus tomentose or velvety..*115. L. betulina*
   Context whitish to light brown; surface glabrous or nearly so, See *112. Daedalea confragosa*
   Context distinctly brown..... 2
2. Surface grayish brown to cinnamon brown; mouths of the tubes circular to elongated, often radially elongated, the edges thin from the first .....*116. L. trabea*
   Surface yellowish red to reddish brown; pore surface usually lamellate, edges at first thick, becoming thin.....*117. L. saepiaria*

115. **Lenzites betulina** (L.) Fries

L. betulina radiata Peck; *L. betulina rufozonata* Peck

Pileus sessile or effused-reflexed, leathery to rigid, 2-5 $\times$ 2-9 $\times$ 0.3-1 cm.; surface grayish to brownish, zonate, sometimes with

multicolored zones, tomentose or velvety, or subglabrous, sometimes radiate-striate; margin thin and acute, fertile below; **context** white, fleshy-tough when fresh, corky when dry, 0.5-1.5 mm. thick, the hyphae rarely to much branched, thick-walled, 2.5-8 μ in diameter, the larger (4-8 μ) rarely branched; rarely poroid, usually lamellate, the **lamellae** white or whitish, about 1 mm. apart, 0.3-1 cm. broad, the edges becoming thin, entire to very minutely serrulate or lacerate; cystidia none, or "present as hyaline, sharp-pointed or blunt hairs, 24-40 $\times$ 4-5 μ, projecting 10-20 μ" (Overholts); basidia not observed; **spores** hyaline, smooth, cylindrical to slightly curved, 4.5-7.5 $\times$ 1-2.5 μ.

On the wood of deciduous or rarely of coniferous trees. Common. Summer and fall.

Illustrations: Hard, Mushrooms, p. 230, *pl. 27, f. 184*, and p. 231, *f. 185.* 1908; Lloyd, Photographs, *Issue No. 14*, and in Mycol. Notes 74: *pl. 325, f. 3114.* 1925; Marshall, Mushroom Book, p. 113, 1905.

Type of rot: brown cubical rot of the wood of deciduous trees, see Hubert, (**3**, p. 416).

116. **Lenzites trabea** (Pers.) Fries

L. vialis Peck; *Gloeophyllum trabeum* (Pers.) Murr.

Pileus sessile or effused-reflexed, coriaceous, 1-4 $\times$ 2-7 $\times$ 0.2-0.8 cm.; surface grayish brown to cinnamon brown, tomentose to glabrous, smooth to tuberculate, azonate; margin thick to thin, sterile or fertile below; **context** cinnamon brown, floccose-fibrous to soft-corky, usually becoming duplex, lighter colored and firmer next the tubes, 1-4 mm. thick, the hyphae of two kinds: brown, thick-walled, rarely branched strand hyphae 3-6 μ in diameter, and hyaline, usually thick-walled, rarely to occasionally branched binding hyphae 2-3 μ in diameter; tubes or **lamellae** concolorous with the context or appearing somewhat lighter colored, often grayish within, 1-3 mm. long, mouths cinnamon brown or darker, circular to elongated, usually radially elongated but rarely becoming truly lamellate, 1-3 per mm. in the transverse direction, the edges thin from the first, entire to dentate or lacerate; cystidia none; basidia 5-6 μ in diameter; **spores** hyaline, smooth, cylindrical to cylindric-ellipsoid, 6-8 $\times$ 3-4 μ.

On the wood of deciduous and coniferous trees, sometimes on cut timber. Frequent.

Illustrations: Overholts, Wash. Univ. Studies 3:98. *pl. 8, f. 46, a-b.* 1915 (as *L. vialis*); Shope, Ann. Missouri Bot. Gard. 18:454. *pl. 38, f. 1.* 1931.

Type of rot: brown cubical rot of deciduous and coniferous wood, see Hubert (**3**, p. 416); and Snell, Mycologia 15:156, 157. 1923.

117. Lenzites saepiaria (Wulf.) Fries

L. sepiaria porosa Peck; *Gloeophyllum hirsutum* (Schaeff.) Murr. in part.

Pileus sessile or effused-reflexed, coriaceous to rigid, 1-6 × 2-7 × 0.3-1 cm.; surface yellowish red to dark reddish brown, grayish black on weathering, strigose-tomentose or velvety to nearly glabrous, zonate; margin at first obtuse, becoming acute, fertile below; **context** yellowish brown to reddish brown, corky, 1-3 mm. thick, the hyphae rarely branched, thick-walled, 4-6 μ in diameter; below sometimes daedaloid or poroid, usually lamellate, the **lamellae** light to dark brown, 1-2 per mm. in transverse direction, 2-5 mm. broad, the edges at first thick, entire, becoming thin and dentate-lacerate; **cystidia** inconspicuous, usually capitately incrusted, 4-5 μ in diameter, projecting up to 10 μ; basidia 4.5-5.5 μ in diameter; **spores** hyaline, smooth, apiculate, cylindrical, 8-10 × 3-4 μ.

On the wood of coniferous or rarely of deciduous trees. Common.

Illustrations: Overholts, Wash. Univ. Studies 3:98. *pl. 8, f. 47, a-b.* 1915; Shope, Ann. Missouri Bot. Gard. 18:452. *pl. 37, f. 1.* 1931; Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull. 214:22. *f. 2,* and *pl. 1,* also *pl. 3, f. 3.* 1911.

Type of rot: brown saprot, see Cartwright and Findlay, Principal Decays Softwoods Used in Great Britain, pp. 59-63. 1938; Hubert (3, pp. 413-416); Snell, Mycologia 15:155, 156. 1923; Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull. 214. 1911, and U. S. Dept. Agr. Tech. Bull. 132. 1929; and Zeller, Phytopathology 11:105. 1921.

OBSERVATIONS

abietina Fries, *Lenzites.* A species closely related to *L. saepiaria,* differing chiefly in the presence of ventricose cystidia. Reported by Peck in *N.Y.S. Mus. Rept.* 41:56. 1888. Not found at Albany. Specimens so referred at Ithaca are *L. saepiaria.*

flaccida (Bull.) Fries, *Lenzites.* Specimens at Albany and Ithaca are *L. betulina.* Listed as a synonym of *L. betulina* by Murrill (8, p. 127).

protracta, Lenzites. Name used by Lloyd, probably for the lenzitoid form of *Trametes protracta* (*T. odorata*).

triata Sw., *Lenzites.* Reported by Peck in *N.Y.S. Mus. Rept.* 27:89. 1875, and in *Rept.* 41:56. 1888. Not found at Albany.

trabea (Pers.), *Trametes.* Poroid form of *L. trabea.*

vetutina, Lenzites. Reported in Lloyd *Letter* 39:2. 1912. A form of *L. betulina.*

CYCLOMYCES Kunze and Fries

Fruiting body annual, terrestrial, stipitate in our species; pileus coriaceous; context brown; pore surface typically concentrically lamellate; cystidia or setae none; spores brown.

The genus is represented in New York State by one species.

118. Cyclomyces greenei Berk.

Cycloporus greenei (Berk.) Murr.

Stem central, velvety, yellowish brown to rusty brown, 2-7 cm. long, 0.7-2 cm. thick; **pileus** coriaceous, circular, usually depressed, 3-10 cm. broad, 0.5-2 cm. thick; surface yellowish brown to rusty brown or purplish brown, at first tomentose, becoming glabrous, more or less zonate; margin obtuse, the lamellae shortening toward the margin and the extreme margin sterile; **context** yellowish brown to cinnamon brown, spongy fibrous to firm fibrous, somewhat zonate, 5-10 mm. thick, the hyphae rarely branched, thin-walled, 7-11 μ in diameter; lamellate or very rarely poroid, the **lamellae** concentrically arranged, brown, up to 8 mm. broad, the edges thin, uneven, splitting with age; setae or cystidia none; basidia not observed; **spores** pale reddish brown under the microscope, smooth, ovoid, 10-14 $\times$ 5-6 μ.

On soil. Rare. Summer and fall.

Illustrations: Hard, Mushrooms, p. 430, *f. 360*, p. 431, *f. 361*. 1908; Icones Farlowianae, p. 103, *pl. 95*. 1929; Lloyd, Mycol. Notes 36:488. *f. 380*, and p. 489, *f. 382*. 1910, Mycol. Notes 45:633. *f. 902*. 1917.

FOMES (Fries) Gill.

Fruiting body typically perennial, epixylous, sessile, sometimes resupinate, corky or more often woody; context white to light or dark brown, or reddish; pore mouths circular, angular, or daedaloid; yearly growth usually taking place by the addition of a new layer of tubes just below the layer of the previous year, the tubes continuous or separated by a thin layer of context, hence the tubes more or less stratified; cystidia or setae present or absent: spores smooth, hyaline or brown.

The perennial habit as shown by the stratified tubes is the distinguishing character of the genus. The usually woody texture of the pileus is an important supplementary character. Certain species of Polyporus, of Daedalea, or of Trametes occasionally persist for two or three years, but are never typically perennial, and will rarely cause confusion.

KEY TO THE SPECIES

1. Context white to light brown 2
   Context flesh color to pinkish or rose colored 7
   Context yellowish brown or darker 8

Context white to light brown

2. Fruiting body small, up to about 2.5 cm. broad 3
   Fruiting body usually much larger, more than 2.5 cm. broad 4
3. Surface of the pileus becoming entirely dark brown or black; spores cylindrical; usually on alder ..... *119. F. scutellatus*
   Surface remaining light colored at the margin; spores ovoid with a truncate apex; on various kinds of wood ..... *120. F. ohiensis*
4. Growing on the wood of coniferous trees 5
   Growing on the wood of deciduous trees 6

5. Pileus resupinate to sessile, usually more or less applanate, not more than 3 cm. thick; context corky, whitish.....*124. F. annosus*
Pileus convex to ungulate, 3-10 cm. thick; context corky to woody, pallid to light brown.....*123. F. pinicola*
Pileus ungulate, 5-30 cm. thick; context friable when dry, white or whitish.....*125. F. officinalis*
6. Surface of the pileus usually white or yellowish, never rimose; cystidia and cystidia-like bodies present in the hymenium; context soft-corky to firm, white or whitish.....*122. F. connatus*
Surface becoming grayish to black, usually more or less smooth; hair-like cystidia present; context corky to woody, pallid to light brown; pores 3-5 per mm.....*123. F. pinicola*
Surface becoming grayish black or black, somewhat rimose with age; cystidia absent; context woody; pores 2-3 per mm., *121. F. fraxinophilus*

Context more or less pink

7. Pileus plane to convex, usually light colored with reddish spots, or altogether reddish; spores ovoid to subglobose; on deciduous wood.....*126. F. fraxineus*
Pileus usually ungulate, pinkish, often black with age; spores cylindrical; on coniferous wood.....*127. F. roseus*
Pileus usually conchate to applanate, pinkish or becoming grayish to black with age; spores cylindrical, sometimes allantoid; on coniferous or rarely on deciduous wood.....See *102. Trametes subrosea*

Context yellowish brown or darker

8. Setae present, though sometimes scarce..... 9
Setae absent..... 14
9. Pileus usually thin and conchate, or fruiting body resupinate..... 10
Pileus plane to convex or ungulate..... 11
10. Pores 1-4 per mm.; hyphae 3-5 μ in diameter; on coniferous wood, *131. F. pini*
Pores 4-7 per mm.; hyphae 2-3 μ in diameter; on deciduous wood, *130. F. conchatus*
Pores 4-5 per mm.; hyphae 3-4 μ in diameter; on deciduous wood, *128a. F. igniarius* var. *laevigatus*
11. Growing only on the wood of coniferous trees.....*131. F. pini*
Growing only on the wood of deciduous trees..... 12
12. Spores brown; usually on oak.....*135. F. everhartii*
Spores hyaline..... 13
13. Growing only on the wood of pomaceous hosts; pileus small, 0-3 cm. broad.....*129. F. pomaceus*
Growing on a wide variety of hosts; pileus larger, 3-10 cm. broad, *128. F. igniarius*
14. Context woody, bright shining yellowish brown..... 15
Context soft and punky, or spongy to soft corky, at least above, dull yellowish brown to dark brown..... 16
15. Pileus soon rimose; spores brown; growing only on locust, *136. F. rimosus*
Pileus smooth or cracking somewhat in age but scarcely rimose; spores hyaline; on various kinds of wood.....*133. F. robustus*
16. Pileus in age becoming slightly incrusted; context duplex; growing at the base of Ribes plants.....*134. F. ribis*
Pileus distinctly incrusted; context homogeneous..... 17
17. Pileus convex to ungulate; spores hyaline.....*132. F. fomentarius*
Pileus plane to convex..... 18
18. Fruiting body reviving and a new pileus growing out below the one of the previous year; crust thin; spores 8-11 $\times$ 5-7 μ.
See *140. Ganoderma lobatum*
Fruiting body truly perennial, the tubes growing out immediately below those of the previous year in the same pileus; crust thin or more often thick; spores 5-7 $\times$ 4-5 μ..See *141. Ganoderma applanatum*

I. Context white to light brown.

A. Fruiting body small, not over 2.5 cm. broad.

119. **Fomes scutellatus** (Schw.) Cooke

Polyporus scutellatus Schw.; *Trametes scutellatus* (Schw.) Morg.

Pileus sessile or sometimes attached by the vertex and circular in outline, rarely resupinate, corky to woody, usually convex to ungulate, 0.5-1.5 × 0.5-2 × 0.2-0.5 cm.; surface entirely dark brown or black, at least when mature, velvety, becoming almost glabrous, azonate, somewhat concentrically sulcate; margin rather thick, acute, fertile below; **context** white to light brown, corky, 2 mm. or less thick, the hyphae somewhat branched, thick-walled, 2-4 μ in diameter; **tubes** concolorous, indistinctly stratified, 1-2 mm. long each season, mouths white to pallid, circular to subcircular, averaging 4-5 per mm., the edges at first thick and obtuse, becoming rather thin, entire; cystidia none; hyphal pegs hyaline to brownish, 25-40 μ in diameter, projecting up to 40 μ; basidia 6-9 μ in diameter; **spores** hyaline, smooth, cylindrical, 8-9 × 2.5-3.5 μ.

On very rotten wood of hardwoods, usually alder. Common.

Illustrations: Overholts, Ann. Missouri Bot. Gard. 2:730. *pl. 25. f. 24.* 1915.

120. **Fomes ohiensis** (Berk.) Murr.

Trametes ohiensis Berk.

Pileus sessile or sometimes attached by the vertex and circular in outline, rarely resupinate, corky when fresh, woody when dry, convex to ungulate, 0.5-2.5 × 0.5-3 × 0.2-1 cm.; surface at first pure white, becoming black at the base but the margin remaining white, finely tomentose to glabrous, often zonate or concentrically sulcate; margin rather thick, acute to obtuse, fertile below; **context** white to light brown, corky, 1-3 mm. thick, the hyphae rarely branched, thick-walled, 3-4 μ in diameter; **tubes** concolorous, indistinctly stratified, 1-5 mm. long each season, the mouths white, circular, averaging 3-5 per mm., the edges remaining rather thick, at least half as thick as the width of the pore, entire; cystidia none; basidia "8-11 μ broad" (Overholts); **spores** usually present, hyaline, smooth, ovoid with a truncate apex, 10-12 × 6-8 μ.

On the wood of deciduous trees, and on cut timber. Occasional.

Illustrations: Coker, Jour. Elisha Mitchell Soc. 43:144. *pl. 14.* 1927 (as Ganoderma); Overholts, Ann. Missouri Bot. Gard. 2:730. *pl. 25. f. 22.* 1915.

B. Fruiting body usually much larger, more than 2.5 cm. broad.

1. On the wood of deciduous trees.

121. Fomes fraxinophilus (Peck) Sacc.

Polyporus fraxinophilus Peck

Pileus sessile, woody, convex to somewhat ungulate, 5-20 × 5-30 × 3-10 cm.; surface at first white, soon grayish black to black, velvety, soon glabrous, somewhat rimose with age, sulcate; margin often remaining light colored, thick, obtuse to acute, usually fertile below; **context** white to light brown, woody, 0.5-1.5 cm. thick, the hyphae rarely branched, rather thick-walled, 3-5 μ in diameter; **tubes** concolorous except the latest growth which is usually lighter in color, white stuffed, indistinctly stratified, 2-4 mm. long each season, mouths white to brownish, circular to angular, averaging 2-3 per mm., the edges thick, entire; cystidia none; basidia 8.5-9.5 μ in diameter; **spores** hyaline, smooth, ellipsoid to ovoid, often truncate at one end, 6-8 × 5-6 μ.

On living or dead trees, usually on ash, also recorded on willow. Rather rare.

Illustrations: Hard, Mushrooms, p. 421, *f. 350.* 1908; Overholts, Ann. Missouri Bot. Gard. 2:730. *pl. 25, f. 19.* 1915; von Schrenk, U. S. Dept. Agr. Bur. Plant Indus Bull. 32: *pl. 2, f. 1-3.* 1903.

Type of rot: white mottled rot of the heartwood of white ash, see Hubert, (**3,** pp. 379-381); von Schrenk, U. S. Dept. Agr. Bur. Plant Indus. Bull. 32. 1903; von Schrenk and Spaulding (**17,** pp. 46-47).

122. Fomes connatus (Weinm.) Gill.

F. populinus (Schum.) Cooke

Pileus sessile, varying to resupinate, corky to somewhat woody, usually convex to subungulate, 2-10 × 3-15 × 0.5-4 cm.; surface white to yellowish, rarely varying to grayish black, often covered with moss or algal growth, velvety-tomentose to glabrous, even, never rimose; margin thick, usually narrowly sterile below; **context** white or whitish, soft-corky to firm, 0.3-1 cm. thick, the hyphae rarely branched, thin-walled, 2-5 μ in diameter; **tubes** white or whitish, distinctly stratified, the strata separated from each other by a thin layer of context, 1-5 mm. long each season, mouths white to yellowish, often glistening, angular, averaging 4-5 per mm., the edges entire to slightly dentate, rather thin; **cystidia** sometimes present, capitate, 3 μ in diameter, also club shaped, sharply angled, and apparently crystalline bodies abundant in the hymenium; basidia 5 μ in diameter; **spores** hyaline, smooth, sometimes one-guttulate, ellipsoid to globose, 4.5-5 × 3-4 μ, or 3-4 μ in diameter.

On the wood of deciduous trees, especially maple. Common.

Illustrations: Lloyd, Synop. Genus Fomes, p. 217, *f. 57 2.* 1915; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:166. *pl. 5, f. 23.* 1914; Overholts, Wash. Univ. Studies 3:94. *pl. 6, f. 29, a-b.* 1915; and Spaulding as below, p. 160.

Type of rot: white rot of the heartwood of deciduous trees, see Hubert (3, p. 387); Solovieff, Mitt. forsttech. Acad. Leningrad 6:22-46. 1935 (reviewed in Rev. Applied Mycology 15:65, 66. 1936); and Spaulding, in Important Tree Pests of the Northeast, pp. 159-161. 1940.

2. Usually on the wood of coniferous trees.

123. **Fomes pinicola** (Swartz) Cooke

Polyporus marginatus (Pers.) Fries; *Fomes ungulatus* (Schaeff.) Sacc.

Pileus sessile, woody, convex to ungulate, 5-15 × 5-20 × 3-10 cm.; surface at first often covered with a reddish resinous layer which may persist at the margin, becoming dry, and varying in color from grayish to black, glabrous, usually rather smooth, sulcate with age; margin obtuse and frequently of a lighter color than the rest of the pileus, often sterile below; **context** pallid to light brown, corky to woody, 0.5-2 cm. thick, the hyphae rarely branched, thick-walled, 5-8 μ in diameter; **tubes** usually concolorous with the context or sometimes darker, distinctly to indistinctly stratified, 2-7 mm. long each season, mouths white to yellowish and darkening where bruised when fresh, cream to brownish when dry, circular, averaging 3-5 per mm., the edges thick, entire; hair-like **cystidia** usually present, tapering upwards, 2-3.5 μ in diameter, projecting up to 30 μ beyond the hymenium; basidia 6-8 μ in diameter; **spores** hyaline, smooth, ellipsoid to ovoid, apiculate, 5-7 × 3-4 μ.

On the wood of coniferous or occasionally of deciduous trees. Common.

Illustrations: Atkinson, Cornell Univ. Agr. Exp. Sta. Bull. 193:221. *f. 80*, p. 222, *f. 81*. 1901 (as Polyporus); Duggar, Fung. Dis. Plants, p. 465, *f. 231*. 1909; Hard, Mushrooms, p. 419. *f. 348*. 1908; Icones Farlowianae, p. 101, *pl. 94*. 1929; Lloyd, Mycol. Notes 54:775. *f. 1168*. 1918 (as *F. marginatus*); Meinecke, Man. Forest Tree Dis. *pl. 11*. 1914; Mounce, Canada Dept. Agr. Bull. N. S. 111, *pl. 1*. 1929; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:166. *pl. 5*, *f. 24*, *a-d* (as *F. ungulatus* and var. *pinicola*), p. 168, *pl. 6*, *f. 25*, *a-c* (as *F. marginatus*). 1914; Overholts, Wash. Univ. Studies 3:92. *pl. 5*, *f. 27*, *a-b*. 1915; Owens, Prin. Plant Path., p. 438, *f. 151*. 1928; Shope, Ann. Missouri Bot. Gard. 18:444. *pl. 33*, (*f. 3* upside down?), and p. 446, *pl. 34*, *f. 2*. 1931; von Schrenk, U. S. Dept. Agr. Div. Veg. Physiol. and Path. Bull. 25: *pl. 4-5*. 1900 (as Polyporus).

Type of rot: sapwood and heartwood rot of coniferous and deciduous trees, see Cartwright and Findlay, Principal Decays of Softwoods Used in Great Britain, pp. 30-32. 1938; Hirt and Eliason, Jour. Forestry 36:705-709. 1938; Jørstad and Juul, Medd. Skogforsøksv. 22:300-496. 1938; and Irene Mounce, Canada Dept. Agr. Bull. N. S. 111. 1929 (biology).

124. Fomes annosus (Fries) Cooke

Pileus resupinate, effused-reflexed, or sessile, corky to woody, irregular in shape, usually more or less applanate, 0-10 × 5-12 × 0.5-3 cm.; surface grayish brown to a uniform light brown, darker with age, velvety to nearly glabrous; the annual tube layers loosely cemented together at their margins, thus surface deeply sulcate; margin acute, sterile below; **context** whitish, corky, 1 cm. or less thick, the upper part forming a hard, dark, thin pellicle, the hyphae from below the pellicle rarely branched, thick-walled, 3-6 μ in diameter; **tubes** white or whitish, often in a single layer, unevenly and indistinctly stratified, old tubes usually stuffed, 2-6 mm. long each season, mouths white to yellowish, circular to angular, irregular, averaging 2-4 per mm., the edges moderately to rather thin, usually remaining entire; cystidia none; basidia "4-7 μ broad" (Shope); **spores** hyaline, smooth, apiculate, ovoid, 4.5-5 × 3.5-4.5 μ.

On the wood of coniferous trees. Occasional. This plant in European pathological literature is usually called *Trametes radiciperda* Hartig.

Illustrations: Baxter as below, p. 122, *pl. 7;* Hiley as below, *figs. 29, 30, 38-40;* Hubert, Outl. For. Path. p. 372, *f. 103.* 1931; Lloyd, Synop. Genus Fomes, p. 217, *f. 573.* 1915; Shope, Ann. Missouri Bot. Gard. 18:450. *pl. 36.* 1931; Spaulding as below, p. 170; Weir, Bull. Vocational Educat. (Idaho) 5, No. 5, p. 47, *f. 15.* 1922.

Type of rot: spongy saprot of coniferous trees, see Baxter, Papers Michigan Acad. Sci., Arts, Lett. 26:116-118. 1941; Boyce (**2**, pp. 115-118); Cartwright and Findlay, Principal Decays Softwood Used in Great Britain, pp. 24-30. 1938; Hiley, Fungal Diseases Common Larch, pp. 80-125. 1919; Hopfgarten, Phytopath. Zeitschr. 6:1-48. 1933; Hubert (**3**, pp. 370-374); Humphrey, Proc. 18th. Ann. Meet. Amer. Wood Pres. Assoc., pp. 213-222. 1922; Jørgensen *et al.*, K. Vet Højsk. Aarsskr. for 1939, pp. 71-128 (reviewed in Rev. Appl. Mycology 18:772. 1939); Roll-Hansen, Medd. Norske Skogforsøksvesen nr. 24, Bd. 7, Hefte 1. 1940; and Spaulding, Important Tree Pests of the Northeast, pp. 169-171. 1940.

125. Fomes officinalis (Vill.) Fries

Fomes laricis (Jacq.) Murr.

Pileus sessile, sometimes attached at the vertex, woody, ungulate, often elongate, 5-12 × 5.25 × 5.30 cm.; surface white, yellowish, or grayish, glabrous, sulcate; margin obtuse; **context** white or whitish, "tough when fresh" (Faull), friable in dry specimens, bitter to the taste, 2-5 cm. thick, the hyphae rarely branched, thick-walled, 3-5 μ in diameter; **tubes** white or whitish, soon becoming white stuffed, indistinctly stratified, 3-8 mm. long each season, mouths white or whitish, or darkening, circular to angular, averaging 3-4 per mm., the edges rather thick to moder-

ately thick, entire; cystidia none; basidia not observed; **spores** hyaline, smooth, ellipsoid to ovoid, 4-5.5 × 3-4 μ.

On the wood of coniferous trees. Not yet reported from New York State but recorded from Ontario and from Massachusetts.

Chlamydospores are reported for this species by Faull (see below) and by Snell (*Phytopathology* 11:173-175. 1921).

Illustrations: Boyce, U. S. Dept. Agr. Bull. 1163: *pl. 6, f. 1.* 1923; Faull, Trans. Roy. Canadian Inst. 11:209. *pl. 18-20.* 1917; Hubert, Outl. For. Path. p. 397, *f. 119.* 1931 (as *F. laricis*); Weir, Bull. Vocational Educat. (Idaho) 5, No. 5, p. 43, *f. 11,* and p. 44, *f. 12.* 1922; Meinecke, Man. For. Tree Dis. *pl. 7.* 1914 (as *F. laricis*); Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:176. *pl. 10.* 1914; Overholts, Wash. Univ. Studies 3:94. *pl. 6, f. 28.* 1915.

Type of rot: brown trunk rot, see Boyce (**2**, pp. 469-471); Faull, Trans. Roy. Canadian Inst. 11:185-209 (1916) 1917, and Hubert (**3**, pp. 395-398).

II. Context flesh colored to rose colored, at least when fresh.

126. **Fomes fraxineus** (Bull.) Cooke

Pileus annual or more rarely perennial, sessile, corky when fresh, rigid and woody when dry, often imbricate, plane to convex, 4-10 × 5-15 × 1-4 cm.; surface light colored, with reddish or reddish brown stains, or altogether reddish, becoming darker with age, minutely velvety to glabrous, with a thin hard crust; margin thin to thick, narrowly sterile below; **context** somewhat flesh colored when fresh, often fading on drying, punky or soft-corky, 0.4-3 cm. thick, the hyphae rarely branched, thick-walled, 5-9 μ in diameter; ovoid to subglobose thin-walled cells 12-16 μ in diameter present or absent in the context; **tubes** concolorous, often in a single layer, 2-10 mm. long each season, mouths whitish to flesh colored, circular to somewhat angular, averaging 4-6 per mm., the edges moderately thick to thick, entire; cystidia none; basidia almost subglobose, 8-10.5 μ in diameter; **spores** hyaline, smooth, apiculate, ovoid to subglobose, 6-7 × 5-6 μ.

On the wood of deciduous trees, recorded on ash and maple. Rather rare.

Illustrations: Baxter, Papers Michigan Acad. Sci., Arts, Lett. 4[1]:66. *pl. 3.* (1924) 1925, and Montgomery as below, p. 486.

Type of rot: white rot, see Montgomery, Ann. Appl. Biol. 23: 465-486. 1936.

127. **Fomes roseus** (Alb. and Schw.) Cooke

Pileus sessile, subwoody, usually ungulate, 2-7 × 2-10 × 2-3 cm.; surface more or less pinkish, often black with age, glabrous or nearly so, sometimes slightly incrusted, rimose when old, sulcate; margin obtuse, sterile below; **context** pinkish or rose colored, soft-corky to hard, indistinctly zonate, 2-10 mm. thick, the

hyphae rarely branched, thick-walled, 3-5 μ in diameter; **tubes** concolorous, distinctly to indistinctly stratified, white stuffed in the older layers, white lined in the younger ones, 1-3 mm. long each season, mouths pinkish or rosy, somewhat brownish with age or where bruised, circular to slightly angular, averaging 3-5 per mm., the edges rather thick to moderately thick, entire; cystidia none; basidia 5-6 μ in diameter; **spores** hyaline, smooth, cylindrical, 6-8 $\times$ 2-3 μ.

On the wood of coniferous trees. Uncommon.

Compare 102. *Trametes subrosea.*

Illustrations: Boyce as below, *pl. 3, fig. 2;* Lloyd, Synop. Genus Fomes, p. 224, *f. 576.* 1915; Shope, Ann. Missouri Bot. Gard. 18: 436. *pl. 29, f. 4-6.* 1931.

Type of rot: brown top rot of the trunks of coniferous trees, see Boyce, U. S. D. A. Bull. 1163. 1923; and Hubert (3, pp. 384-386).

III. Context yellowish brown or darker.

A. Spores hyaline.

1. Setae present

128. **Fomes igniarius** (L.) Gill.

Fomes nigricans (Fries) Gill.; *Pyropolyporus igniarius* (L.) Murr.

Pileus sessile, woody, plane to convex or ungulate, 3-10 $\times$ 3-20 $\times$ 2-11 cm.; surface grayish black to black, sometimes shiny, becoming glabrous, at first smooth, becoming more or less rimose and incrusted with age; margin obtuse, sometimes very thick and yellowish brown in color, sterile below; **context** dark brown, woody, 0.5-1 cm. thick, the hyphae rarely branched, thick-walled, 3-4 μ in diameter; **tubes** concolorous or appearing lighter colored, the older layers conspicuously white stuffed, usually indistinctly stratified, 2-5 mm. long each season, mouths brown, circular, averaging 4-5 per mm., the edges rather thick, entire; **setae** usually abundant, sometimes rare, 6-8 μ in diameter, projecting 12-16 μ beyond the hymenium; basidia 6.5-7.5 μ in diameter; **spores** hyaline, smooth, ovoid to subglobose, 4-6 $\times$ 4-5 μ.

On living deciduous trees. Common.

Illustrations: Atkinson, Cornell Univ. Agr. Exp. Sta. Bull. 193:213. *f. 71-72,* p. 214, *f. 73,* p. 215, *f. 74.* 1901 (as Polyporus); Hard, Mushrooms, p. 420, *f. 349.* 1908; Hepting, Emerg. Conserv. Work Forestry Publ. 2, *fig. 2.* 1934; Hubert, Outl. For. Path., p. 391. *f. 116.* 1931; Lloyd, Mycol. Notes 29:372, *f. 193* (as *F. nigricans*) and p. 373, *f. 194.* 1908, repeated in Polyp. Issue 1:15. *f. 209* and p. 16, *f. 210.* 1908; Meinecke, Man. For. Tree Dis., *pl. 15.* 1914; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:172. *pl. 8, f. 29, a-d* (as *F. nigricans* and var. *populinus*). 1914; Overholts, Ann. Missouri Bot. Gard. 2:730. *pl. 25, f. 18, 20-21.* 1915 (as var. *nigricans*); Rankin, Man. Tree Dis., p. 307, *f. 59* and p. 308 *f. 60* (*f. 61* probably *F. fomentarius*) 1923; Shope,

Ann. Missouri Bot. Gard. 18:448. *pl. 35.* 1931; Spaulding as below, p. 163; Verrall, Univ. Minnesota Exp. Sta. Tech. Bull. 117, *figs. 1-4.* 1937; von Schrenk and Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull. 149: *pl. 6, f. 1-2.* 1909 (as *F. nigricans*).

Type of rot: white trunk rot of deciduous trees, see Boyce (**2**, pp. 441-445); Horton and Hendee, Jour. Forestry 32:493, 494. 1934; Hubert (**3**, pp. 388-395); Meinecke, U. S. Dept. Agr. Tech. Bull. 155. 1929; Schmitz and Jackson, Univ. Minnesota Agr. Exp. Sta. Tech. Bull. 50. 1927; Spaulding in Important Tree Pests of the Northeast, pp. 162-164. 1940; von Schrenk and Spaulding (**17**, pp. 25-37, 42-44); and Vanine, Leningrad Forestry Inst. News 36. 1938, reviewed in Rev. Appl. Mycology 8:411-412. 1929.

128a. **Fomes igniarius** var. **laevigatus** Fries

The resupinate form of *Fomes igniarius*, or at least a species very closely related to *F. igniarius*.

This variety is described by Overholts (*Mycologia* 23:126. 1931) as a resupinate fruiting body with pores averaging 4-5 per mm. and spores hyaline, globose, 5-6.5 μ in diameter. *Fomitiporia betulina* Murr. (*Poria betulina* [Murr.] Kauff.) is given as a synonym.

According to Romell, however, the *Fomes laevigatus* of Fries is a distinct, though closely related (to *F. igniarius*) species. He describes *F. (Pol.) laevigatus* Fries as a resupinate species which is typically thin, with pores 5-7 or 4-8 per mm., and spores 3-5 μ in diameter, or 4-5 $\times$ 3-4 μ (see *Arkiv för Botanik*, Band 11. No. 3, p. 16. 1911).

On the wood of deciduous trees. Frequent.

Illustrations: Baxter, Papers Michigan Acad. Sci., Arts, Lett. 17:440, *pl. 50, fig. 2.* 1933.

Type of rot: associated with canker, see Campbell and Davidson, Jour. Forestry 39:559, 560. 1941.

129. **Fomes pomaceus** (Pers.) Lloyd

Fomes fulvus (Scop.) Gill.; *Pyropolyporus fulvus* (Scop.) Murr.

Fruiting body usually resupinate on the under side of branches and by annual growth forming a subcircular to elongated pendant pileus, rarely strictly sessile and convex to ungulate, woody, 0-3 $\times$ 2-10 $\times$ 0.5-5 cm.; surface usually brown on the margin, gray to grayish black behind, hirsute to glabrous, with age becoming more or less rimose, somewhat incrusted; margin obtuse, sterile below; **context** yellowish brown, woody, 3-8 mm. thick, the hyphae rarely branched, rather thick-walled, 3-4 μ in diameter; **tubes** brown, occasionally white stuffed in the older layers but not markedly so, 1-4 mm. long each season, mouths brown, circular, averaging 4-5 per mm., the edges rather thick, entire; **setae** infrequent, sometimes apparently absent, 6-8 μ in diameter, projecting 12-16 μ beyond the hymenium; basidia 5.5-6.5 μ in diameter; **spores** hyaline, smooth, subglobose to globose, 4-6 μ.

On pomaceous substrata. Not yet recorded from New York State. The species is very closely related to *F. igniarius*, differing chiefly in its host specialization.

The transfer of this species to the genus Fomes is usually attributed to Bigeard and Guillemin (*Fl. Champ. France* 2:355. 1913). Lloyd published this combination in Lloyd *Mycol. Notes* 35:469. 1910.

Illustrations: Lloyd, Synop. Genus Fomes, p. 241, *f. 588*. 1915; Overholts, Wash. Univ. Studies 3:96. *pl. 7, f. 35, a-b*. 1915 (as *F. fulvus*); Shope, Ann. Missouri Bot. Gard. 18:446. *pl. 34, f. 4-6*. 1931 (as *F. fulvus*).

Type of rot: brown rot, see Fisher, Trans. Brit. Mycol. Soc. 19: 102-113. 1935, and von Schrenk and Spaulding (**17**, p. 47).

130. **Fomes conchatus** (Pers.) Gill.

Pyropolyporus conchatus (Pers.) Murr.

Pileus effused-reflexed or resupinate, rarely sessile and then thin and conchate, woody, 0-5 × 4-10 × 0.2-3 cm.; surface grayish brown or yellowish brown to black, tomentose, concentrically sulcate, not rimose but with age becoming incrusted; margin acute, sterile below; **context** brown, woody, containing one to several narrow black lines, 1-3 mm. thick, the hyphae rarely branched, thick-walled, 2-3 μ in diameter; **tubes** concolorous, indistinctly stratified, 0.5-3 mm. long each season, mouths yellowish brown to dark brown, circular, 4-7 per mm., the edges rather thick, entire; **setae** occassional to rare, ventricose, 5-10 μ in diameter, projecting up to 20 μ beyond the hymenium; basidia 4-6 μ in diameter; **spores** hyaline, smooth, ovoid to subglobose, 4.5-6 × 4-5 μ.

On the wood of deciduous trees, especially ash. Common. Very similar in appearance to the thin form of *F. pini* but easily distinguished by the kind of substratum and its smaller pores.

Illustrations: Overholts, Wash. Univ. Studies 3:94. *pl. 6, f. 33, a-c*. 1915.

Fomes densus Lloyd *Synop. Genus Fomes* (1915), p. 245, has been reported from Ohio and eventually, no doubt, will be recognized from New York State. According to Lloyd this species is a thick, heavy form of *F. conchatus*. Overholts (*Mycologia* 23:126. 1931) separates it from *F. conchatus* on more certain characters. According to him the pores are smaller, averaging 8-10 per mm., and the spores are pale rusty, 3-3.5 μ in diameter. It grows on a substratum of the wood of deciduous trees.

131. **Fomes pini** (Thore) Karst.

Trametes pini (Thore) Fries; *T. piceina* Peck; *T. abietis* Karst.; *Polyporus piceinus* Peck; *Polystictus piceinus* (Peck) Sacc.; *Porodaedalea pini* (Thore) Murr.

Pileus annual or perennial, sessile, effused-reflexed, or resupinate, thin and conchate, or ungulate, 0-15 × 1-20 × 0.3-15 cm.; surface at first yellowish brown to reddish brown with elevated

zones of appressed tomentum, becoming grayish black or brownish black toward the base, or, in the ungulate form, becoming blackish, glabrous, cracking and becoming rough; margin obtuse to acute, sterile or fertile below; **context** yellowish brown to reddish brown, woody, 1-5 mm. thick, the hyphae rarely branched, rather thick-walled, 3-5 μ in diameter; **tubes** concolorous or lighter colored, the walls whitish incrusted, in one layer or indistinctly stratified, 2-6 mm. long each season, mouth yellowish brown to reddish brown, angular to sinuous or daedaloid, usually 3-4 per mm., or, in the ungulate form, 1-3 per mm., the edges thin, entire; **setae** abundant, 8-12 μ in diameter, projecting up to 30 μ; basidia 4-5 μ in diameter; **spores** hyaline to brown, smooth, subglobose to globose, 4-5 μ.

On living or dead coniferous trees, and on cut timber. Common. The ungulate form is said to be common on living white pine and spruce while the thin reflexed form occurs usually on down spruce.

Haddow (in *Trans. Brit. Mycol. Soc.* 22:182-193. 1938) has recently published an extensive paper on this species.

Illustrations: Abbott, Vermont Agr. Exp. Sta. Bull. 191:18. *pl. 3.* 1915 (as Trametes); Lloyd, Synop. Genus Fomes, p. 275, *f. 608-609* and p. 276, *f. 610* (as *Trametes piceina*) 1915; Meinecke, Man. Forest Tree Dis. *pl. 4-5.* 1914 (as *Trametes*); Owens as below, p. 150-158, *pl. 1-9;* Shope, Ann. Missouri Bot. Gard. 18:442. *pl. 32, f. 2-3.* 1931; and Spaulding as below, p. 166.

Type of rot: red ring rot, see Abbott, Vermont Agr. Exp. Sta. Bull. 191. 1915; Boyce (**2**, pp. 417-425); Cartwright and Findlay, Principal Decays Softwood Used in Great Britain, pp. 40-45. 1938; Hiley, Fungal Diseases Common Larch, pp. 140-143. 1919; Hubert (**3**, pp. 399-411); Jørstad and Juul, Medd. Norske Skogforsøksv. nr.22, B. 6, H. 3, pp. 300-496. 1938; Liese, Forstarchiv 12:37-48. 1936; Owens, Amer. Jour. Bot. 23:144-158, 235-254. 1936; and Percival, W. C., N. Y. S. Coll. Forestry Tech. Publ. 40. 1934 (biology); and Spaulding, Important Tree Pests Northeast, pp. 165-168. 1940.

2. Setae absent.

132. Fomes fomentarius (L.) Kickx.

Elfvingia fomentaria (L.) Murr.; *Elfvingiella fomentaria* (L.) Murr.

Pileus sessile, woody, convex to ungulate, 3-10 $\times$ 5-15 $\times$ 3-10 cm.; surface grayish to brown or grayish black, glabrous, concentrically sulcate, with a thick horny crust which is black and shiny in section; margin thick and obtuse, narrowly sterile below; **context** dark brown, soft and punky, indistinctly zonate, 0.3-3 cm. thick, the hyphae rarely branched, thick-walled, 5-10 μ in diameter; **tubes** lighter colored than the context, usually white stuffed or white incrusted, rather distinctly stratified, 0.3-2.5 cm. long, mouths grayish to brown, circular, averaging 3 per mm., the edges thick, entire; cystidia or setae none; basidia not observed; **spores** hyaline, smooth, cylindric-ellipsoid, 12-16 $\times$ 4-5 μ.

On living and dead deciduous trees. Common. An extensive

synonomy of this species is cited by Hilborn and Linder (*Mycologia* 31:418-419. 1939).

Illustrations: Hepting, Emerg. Conserv. Work Forestry publ. 2, *fig. 6.* 1934; Kellerman, Jour. Mycol. 9:169. *pl. 3.* 1903; Lloyd, Synop. Genus Fomes, p. 236, *f. 584* (sectional figure upside down) 1915; Marshall, Mushroom Book, p. 110. 1905; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:174. *pl. 9, f. 30, a-b.* 1914; Overholts, Wash. Univ. Studies 3:94. *pl. 6, f. 32, a-b.* 1915; Rankin, Man. Tree Dis., p. 106, *f. 11.* 1923; von Schrenk and P. Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull 149: *pl. 8, f. 1.* 1909; White, Connecticut Geol. and Nat. Hist. Surv. Bull. 3:63. *pl. 35.* 1905.

Type of rot: white mottled rot of heartwood and sapwood, see Buchwald, Medd. Foren. Svampekundsk. Fremme (1930), pp. 49-92; Hilborn, Phytopathology 31:11. 1941; Hubert (**3**, p. 379); Macdonald, Trans. Bot. Soc. Edinburg 32:396-408. 1938; and von Schrenk and Spaulding (**17**, pp. 50-51).

133. **Fomes robustus** Karst.

F. bakeri (Murr.) Sacc.; *Pyropolyporus bakeri* Murr.

Pileus sessile, woody, convex to compressed-ungulate, 3-8 × 5-15 × 2-5 cm.; surface usually brown or grayish brown on the margin, grayish black to black behind, glabrous, smooth or cracking somewhat with age but scarcely rimose; margin thick, acute to obtuse, with a broad rusty red band, more or less fertile below; **context** bright yellowish brown, shining, woody, fibrous, zonate, 1-2.5 cm. thick, the hyphae rarely branched, thick-walled, 4-6 μ in diameter; **tubes** appearing lighter in color than the context, distinctly to indistinctly stratified, more or less white incrusted or stuffed in the older layers, 4-7 mm. long each season, mouths brown, circular, averaging 4-6 per mm., the edges thick, entire; setae none; cystidia none or represented by hyaline, blunt bodies about 6 μ in diameter scarcely projecting from the hymenium; basidia 9.5-10.5 μ in diameter; **spores** hyaline, smooth, one-guttulate, subglobose, 5-6 μ.

On deciduous or coniferous trees, all collections so referred uncertain. The species has been collected in neighboring states. A comparison of this species with *Fomes hartigii* (Allesch.) Sacc. and Trav. is given by Lohwag, in *Ann. Mycologici* 35:339-349. 1937.

Illustrations: Baxter, Pap. Michigan Acad. Sci., Arts, Lett. 17:440, *pl. 44.* 1933; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:168. *pl. 6, f. 27a,* and p. 170, *pl. 7, f. 27, b-d.* 1914 (as *F. bakeri*); Overholts, Wash. Univ. Studies 3:94. *pl. 6, f. 31.* 1915 (as *F. bakeri*); and in Mycologia 12:142. *pl. 9.* 1920 (as *F. bakeri*).

Type of rot: see Lohwag, Zeitschr. Pflanzenkrankh. u. Pflanzensch. 50:481-494. 1940.

B. Spores brown.

1. Context duplex; setae none.

134. Fomes ribis (Schum.) Gill.

Pyropolyporus ribis (Schum.) Murr.

Pileus sessile, corky to subwoody, thin and applanate, 2-12 × 2-20 × 0.5-1.5 cm.; surface light brown to dark brown, grayish to black with age, sometimes green with moss and algal growth, minutely velvety near the margin, zoned or sulcate behind, in age sometimes becoming slightly incrusted; margin obtuse to acute, sterile below; **context** yellowish brown, duplex, soft and spongy above, woody and lighter colored next the tubes, the two portions separated by a thin dark line, 2-10 mm. thick, the hyphae from next the tubes rarely branched, thin- to medium thick-walled, 3.5-5 μ in diameter; **tubes** concolorous with the adjacent context, indistinctly stratified, 0.5-3 mm. long each season, mouths yellowish brown to reddish brown, circular to angular, averaging 5-7 per mm., the edges entire, moderately thick to thick; cystidia or setae none; basidia 4-5 μ in diameter; **spores** pale to light brown under the microscope, smooth, ellipsoid to subglobose, 2.5-4 × 2.5-3 μ.

At the base of stems of cultivated Ribes, recorded only on current bushes. Rather rare.

Illustrations: Lloyd, Synop. Genus Fomes, p. 252. *f. 594.* 1915; Overholts, Wash. Univ. Studies 3:94. *pl. 6, f. 30, a-e.* 1915; McCubbin as below, *pl. 69;* Stewart as below, *pl. 7.* 1919.

Type of rot: of Ribes and sassafras, see McCubbin, Rept. Field Lab. St. Catherines Canada Exp. Farms for 1914, pp. 966-989. 1916; Spaulding, Science (N.S.) 26:479, 480. 1907; Stewart, N. Y. Agric. Exp. Sta. Geneva Bull. 463, p. 179. 1919.

2. Context homogeneous, woody; setae present or absent (compare also 131. F. pini).

135. Fomes everhartii (Ell. and Gall.) von Schrenk

Pyropolyporus everhartii (Ell. and Gall.) Murr.

Pileus sessile, woody, convex, rarely ungulate, 5-15 × 5-30 × 2-15 cm.; surface at first uniformly yellowish brown, becoming grayish black or black behind but remaining brown on the margin, velvety when young, rough and rimose with age, concentrically sulcate; margin obtuse, fertile below; **context** reddish brown, woody, somewhat zonate, 1-4 cm. thick, the hyphae rarely branched, thin- to thick-walled, 3-6 μ in diameter; **tubes** more or less concolorous, indistinctly stratified, somewhat white incrusted within, 2-6 mm. long each season, mouths brown, glancing, circular to angular, averaging 4-6 per mm., the edges thin, entire; **setae** 6-9 μ in diameter, projecting up to 20 μ beyond the hymenium; basidia 6-8 μ in diameter; **spores** brown, smooth, ellipsoid to globose, 4-4.5 × 3-3.5 μ or 4-5 μ in diameter.

On living trunks of deciduous trees, usually oak. Uncommon.

Illustrations: Hepting, Emerg. Conserv. Work Forestry Publ. 2, *fig. 3.* 1934; Hirt, Mycologia 22:311. *pl. 25. f. 1-4.* 1930; Neuman, Wisconsin Geol. and Nat. Hist. Surv. Bull. 33:168. *pl. 6, f. 26a* and p. 170. *pl. 7, f. 26b.* 1914; Overholts, Wash. Univ. Studies 3:94. *pl. 6, f. 34, a-b.* 1915.

Type of rot: white spongy heartrot of deciduous trees, see Hirt, Mycologia 22:310-311. 1930; Hubert (**3**, pp. 378, 379); Hedgcock, Phytopathology 2:74, 75. 1912; and Graves, Mycologia 11:120-121. 1919.

136. **Fomes rimosus** (Berk.) Cooke

Fulvifomes robineae Murr.; *Pyropolyporus robineae* Murr.

Pileus sessile, woody, convex to ungulate, 5-20 × 5-30 × 2-10 cm.; surface at first uniformly brown and velvety, darkening and soon becoming minutely strigose, then black and glabrous, incrusted and rimose with age, concentrically sulcate; margin thick to thin, obtuse, often remaining brown and velvety for some time, sterile or fertile below; **context** bright yellowish brown, shining, woody, fibrous, zonate, 0.5-3 cm. thick, the hyphae rarely branched, rather thick-walled, 3-5 μ in diameter; **tubes** more or less concolorous with the context, indistinctly stratified, 1-4 mm. long each season, mouths brown, circular, averaging 5-6 per mm., the edges rather thick, entire; cystidia or setae none; basidia 6-7.5 μ in diameter; **spores** brown, smooth, subglobose to globose, 4-5 μ.

On the trunks of living locust (Robinia). Common.

Illustrations: Hard, Mushrooms, p. 418, *f. 347.* 1908; Overholts, Wash. Univ. Studies 3:96. *pl. 7, f. 38, a-b.* 1915; Rankin, Man. Tree Diseases, p. 220, *f. 35.* 1923; von Schrenk, Ann. Rept. Missouri Bot. Gard. 12:31. *pl. 1-2.* 1901 (as Polyporus).

Type of rot: yellow heartrot of locust, see von Schrenk, Ann. Rept. Missouri Bot. Gard. 12:21-32. 1901; von Schrenk and Spaulding (**17**, pp. 45-46).

OBSERVATIONS

hartigii (Allesch.) Sacc. and Trott., *Fomes.* Two specimens at CU, on hemlock, Ithaca, are species of Poria.

laevigata var. *exaculeata, Poria.* CU no. 6045. Not studied.

nigricans Rost. non Fries, *Fomes.* SM., Osceola, on *Betula lutea.* Det. J. R. Weir. The specimen does not appear to differ from *F. igniarius* as described herein, but the spores were not demonstrated.

novae-angliae (Berk), *Fomes.* Doubtfully reported by Lloyd in *Letter* 11:7. 1906. The species is considered synonymous with *F. igniarius* by Shope (**19**, p. 382), doubtfully synonymous with *F. igniarius* by Murrill (**8**, p. 103), but Lloyd (**6**, p. 283) states "The type, a single specimen, is a thin, brown Polyporus, closely related to Polyporus rutilans."

obducens (Pers.), *Poria.* Usually considered to be the resupinate form of *F. connatus.*

salicinus (Pers.) Gill., *Fomes.* Usually considered to be a form of *F. conchatus* on willow. Collections at Albany referred to various species of Poria.

ulmarius (Sow.), (*Fomes*) *Polyporus*. Reported in *N.Y.S. Mus. Rept.* 23:52. 1873. Specimen not found at Albany. According to Lloyd (6, p. 228) the typical form of this species is not found in the United States but *F. geotropus*, which occurs in the Gulf States, is the tropical form of it and is probably the same species. *Bresadola* (*Ann. Mycol.* 18:68. 1920), Hemmi *et al.* (Bot. Mag. [Tokyo] 43:674. 1929), and Hemmi (*Mem. Coll. Agr. Kyoto Imp. Univ.* No. 20 [*Phytopath. Series* No. 5], p. 4. 1932) consider *F. geotropus* to be synonymous with *F. ulmarius*.

GANODERMA Karst. emend. Pat.

Fruiting body annual, or perennial, stipitate or sessile, leathery to woody; surface covered with a reddish, yellowish, olivaceous, or grayish to dark crust; context white to brown; pore mouths circular to angular; cystidia or setae none; spores brown, the endospore with minute spines which project into or through the epispore, the spore thus appearing echinulate.

The peculiar spores characterize the genus. The taxonomy of the New York State species, and of others, has been treated very ably by Haddow in the *Jour. Arnold Arboretum* 12:25-46. 1931. White (*Trans. Roy. Canadian Inst.* 12:138. 1919) first correctly interpreted the structure of the spore wall. Later Coleman (*Bot. Gaz.* 83:48-60. 1927) confirmed and extended White's observations by cytological methods.

KEY TO THE SPECIES

1. Fruiting body usually stipitate 2
   Fruiting body sessile, or appearing substipitate 3
2. Surface of the pileus bright red to deep mahogany or almost black; margin usually acute ..... *137. G. lucidum*
   Surface yellowish brown or more or less olivaceous; margin thick and obtuse when mature ..... *138. G. curtisii*
3. Surface laccate, light red to brownish red or darker ..... *139. G. sessile*
   Surface not laccate, with a thin to thick grayish or darker crust 4
4. Fruiting body typically perennial, the tubes stratified; spores 5-7 × 4-5 μ ..... *141. Ganoderma applanatum*
   Fruiting body reviving for 2-3 years, producing pilei which come out below those of the previous year, thus tubes not stratified; spores 8-11 × 5-7 μ ..... *140. Ganoderma lobatum*

137. Ganoderma lucidum (Leyss.) Karst.

G. tsugae Murr.; *Polyporus lucidus* (Leyss.) Fries; *P. tsugae* (Murr.) Overh.; *Polyporus metallicus* Lloyd

Stem lateral, elongated to short tuberculate, rarely lacking, surface dark, laccate, 4-12 cm. long, 1.5-3 cm. thick; **pileus** leathery to corky, dimidiate to reniform, 5-15 × 6-25 × 1-4 cm.; surface heavily laccate, bright red to deep mahogany or almost black, glabrous, sulcate; margin usually acute, sterile below; **context** white to light brown, darker next the tubes, felty to corky, rarely radiately fibrous, 0.2-2 cm. thick, the hyphae thick-walled, usually of two kinds, some infrequently branched, 4-15 μ in diameter, others much branched, 1-4 μ; **tubes** cinnamon brown to dark brown, rarely in two layers, 0.2-1.5 cm. long, mouths white to brown, when fresh glaucous, turning brown where

bruised, circular to angular, averaging 3-6 per mm., the edges moderately thick to rather thick, entire; cystidia none; basidia 10-14 μ in diameter; **spores** light brown, appearing coarsely echinulate, ovoid with a truncate apex, 10-12 $\times$ 6-7.5 μ.

On the wood of coniferous or deciduous trees. Common.

Illustrations: Atkinson, Bot. Gaz. 46:323. *f. 1.* 1908. (as *G. pseudoboletum*), also in Mushrooms, ed. 3, p. 193, *pl. 72, f. 188.* 1911 (as Polyporus); Güssow and Odell, Mushrooms and Toadstools, p. 195, *pl. 100, f. 2.* 1927; Haddow, Jour. Arnold Arboretum 12:46. *pl. 29, f. 1-3.* 1931; Hard, Mushrooms, p. 404, *f. 332.* 1908 (as Polyporus); Lloyd, Mycol. Notes 65. *pl. 175, f. 1904.* 1920 (as Polyporus); Overholts, Wash. Univ. Studies 3:90. *pl. 4, f. 20, a-b* (as Polyporus) and p. 92. *pl. 5, f. 23, a-b.* 1915 (as *P. tsugae*).

Type of rot: saprot of hemlock, see Hepting, U. S. D. A. Tech. Bull. 494. 1935; Venkatarayan, Phytopathology 26:153-175. 1936; and West, Mycologia 11:262-266. 1919.

138. **Ganoderma curtisii** (Berk.) Murr.

Polyporus curtisii Berk.

Stem usually lateral, or excentric to central, laccate, yellowish brown to brick red, 3-6 cm. long, 1.5-2.5 cm. thick; **pileus** firm to hard, reniform to circular, 3-15 $\times$ 3-20 $\times$ 0.7-3 cm.; surface yellowish-brown or more or less olivaceous, thinly laccate, glabrous, often zonate; margin usually thick and obtuse when mature, sterile below; **context** duplex, the lower layer dark chocolate brown and firm, the upper layer nearly white and soft, felty to radiately fibrous, 0.5-1.5 cm. thick, the hyphae hyaline to brown, infrequently to frequently branched, thick-walled, 3-5 μ in diameter; **tubes** cinnamon brown to dark brown, 0.3-1.2 cm. long, mouths whitish to brownish, circular to subcircular, averaging 3-5 per mm., the edges thin, entire; cystidia none; basidia not observed; **spores** light brown, appearing echinulate, variable in size and shape, mostly ovoid, sometimes truncate at one end, 9.5-11 $\times$ 5-6 μ.

On the wood of deciduous trees. Rather rare, and has been found only in the vicinity of New York City. Summer and fall.

Illustrations: Atkinson, Bot. Gaz. 46:327. *f. 3.* 1908; Haddow, Jour. Arnold Arboretum 12:46. *pl. 29, f. 6.* 1931; Overholts, Wash. Univ. Studies 3:90. *pl. 4, f. 21.* 1915 (as Polyporus).

Type of rot: white basal rot of oak, see Long, Phytopathology 20:758. 1930.

139. **Ganoderma sessile** Murr.

Polyporus sessilis (Murr.) Lloyd

Pileus sessile, rarely stipitate, dimidiate, plane to slightly convex above, usually thickened behind, 5-15 $\times$ 7-25 $\times$ 1.3 cm.; surface light red to brownish red or darker, thinly laccate, fre-

quently concentrically sulcate; margin acute, sterile below; **context** duplex, consisting of an upper light brown and a lower cinnamon brown to chocolate brown layer, radiately fibrous, 0.2-1.5 cm. thick, the hyphae thick-walled, of two kinds, some rarely branched, 4-8 μ in diameter, others often branched, 1-3 μ; **tubes** cinnamon brown to dark brown, 0.5-2 cm. long, mouths whitish to dark brown, glaucous, turning brownish where bruised, circular to angular, averaging 3-5 per mm., the edges thin, entire; cystidia none; basidia not observed; **spores** light brown, thin-walled, appearing echinulate, ovoid, usually truncate at the apex, 10.5-12 $\times$ 6-7 μ.

On the wood of deciduous and of coniferous trees. Frequent.

Illustrations: Haddow, Jour. Arnold Arboretum 12:46. *pl. 29, f. 4-5.* 1931.

Type of rot: probably a wound parasite, destroying bark and cambium, see Pollock in Rept. Mich. Acad. Sci. 7:53-54. 1905.

140. Ganoderma lobatum (Schw.) comb. nov.

Elfvingia lobata (Schw.) Murr.; *E. reniformis* (Morg.) Murr.; *Fomes lobatus* (Schw.) Cooke

Fruiting body reviving for two or three years and producing each year a pileus below the one of the previous year; **pilei** sessile or more often appearing substipitate, corky, 4-10 $\times$ 4-15 $\times$ 1-3 cm.; surface yellowish brown or reddish brown to dark brown, glabrous, covered with a thin but distinct, easily indented crust; margin thin, acute, narrowly sterile below; **context** dark brown, soft and punky, 0.3-1.5 cm. thick, the hyphae rarely branched, usually thick-walled, 3-6 μ in diameter; **tubes** more or less concolorous with the context, not stratified, 0.3-1 cm. long, mouths white, yellowish, or brown, darker where bruised, circular to subcircular, averaging 4-5 per mm., the edges rather thin, entire; cystidia or setae none; basidia 9-10 μ in diameter; **spores** pale brown, appearing minutely echinulate, ellipsoid to ovoid with a truncate apex, 8-11 $\times$ 5-7 μ.

On deciduous trees, recorded only on red oak. Rare, one collection recorded, Brooklyn, W. A. Murrill.

Illustrations: Overholts, Wash. Univ. Studies 3:96. *pl. 7, f. 36, a-b.* 1915 (as Fomes).

141. Ganoderma applanatum (Pers.) Pat.

Fomes applanatus (Pers.) Gill.; *F. leucophaeus* (Mont.) Cooke; *F. megaloma* (Lév.) Cooke; *Elfvingia megaloma* (Lév.) Murr.; *Ganoderma lipsiensis* (Batsch) Atk.

Pileus sessile, woody, plane to convex, 5-30 $\times$ 5-50 $\times$ 2-10 cm.; surface usually grayish or grayish black, covered with a thick horny crust which is black and shiny in section, or more rarely with a thin crust; margin obtuse, sterile below; **context** dark brown, punky to soft corky, 0.5-3 cm. thick, the hyphae rarely branched, thick-walled, 3-6 μ in diameter; **tubes** when young

more or less concolorous with the context, becoming white stuffed, rather distinctly stratified, each layer usually separated by a distinct layer of context, 0.4-1.5 cm. long each season, mouths white when young, or rarely yellowish, darker where bruised, in age becoming concolorous with the tubes, circular, averaging 4-6 per mm., the edges moderately thick to rather thin, entire; cystidia or setae none, but, according to Shope, "hymenium containing simple or forked, unequally thickened hyphae which extend beyond the basidia"; basidia 10-11 μ in diameter; **spores** brown, appearing slightly echinulate, ovoid with a truncate apex, 5-7 $\times$ 4-5 μ.

On living or dead deciduous or rarely coniferous trees. Common.

Illustrations: Atkinson, Cornell Univ. Agr. Exp. Sta. Bull. 193:223. *f. 82.* 1901, and Ann. Mycol. 6: *t. 2-3.* 1908 (as Polyporus), also in Mushrooms, ed. 3, p. 15, *f. 15.* 1911 (as Polyporus); Hepting, Emerg. Conserv. Work Forestry Publ. 2, *fig. 5.* 1934 (as Fomes); Hesler, Jour. Tennessee Acad. Sci. 4:7. *f. 4.* 1929 (as Fomes); Krieger, Nat. Geogr. Mag. 37:409. 1920 (as Fomes); Lloyd, Mycol. Notes 62: *pl. 152, f. 1729.* 1920 (as Polyporus); Overholts, Wash. Univ. Studies 3:96. *pl. 7, f. 37, a-b.* 1915 (as Fomes); Shope, Ann. Missouri Bot. Gard. 18:442. *pl. 32, f. 4.* 1931; von Schrenk and Spaulding, U. S. Dept. Agr. Bur. Plant Indus. Bull. 149:59. *f. 8.* 1909 (as Fomes); E. A. White, Connecticut Geol. and Nat. Hist. Surv. Bull. 3:63. *pl. 35.* 1905 (as Fomes); J. H. White, Trans. Roy. Canadian Inst. 12:174. *pl. 2, f. 1.* 1919 (as Fomes).

Type of rot: white butt rot of deciduous trees, see Hubert (3, pp. 374-378); Meinecke, U. S. Dept. Agr. Tech. Bull. 155. 1929; White, Trans. Roy. Canadian Inst. 12:133-174. 1919 (biology).

OBSERVATIONS

pseudoboletum (Jacq.) Murr., *Ganoderma.* As recorded in *Torreya* 14:215. 1914, subsequently changed to *G. curtisii* (*Torreya* 21:9. 1921). *G. pseudoboletum* is a synonym of *G. lucidum.*

GLOSSARY

Acute (of the margin). Narrowed to a point.

Adnate (of the tubes). Attached to the stem for the length of the tubes but not running down the stem.

Agglutinate. Uniting or fusing together, as if by glue; collapsing and adhering together.

Allantoid. Elongate and curved, with the sides parallel; sausage shaped. See Illus. II, fig. 32.

Anastomosing. Running together irregularly; forming a network.

Apiculate. Provided with an apiculus, a short often sharp papilla by which the spore was attached to the sterigma. See Illus. II, fig. 38.

Applanate. Flattened out horizontally; horizontally expanded. See Illus. I, fig. 5.

Appressed (of scales, fibrils, hairs, etc.). Closely pressed to the surface.

Areolate. With the surface marked out into small areas or spaces.

Attenuate. Tapering or narrowing.

Azonate. Without zones.

Basidium (plural *basidia*). The specialized terminal cell of a hypha in the hymenium that bears the spores in the basidiomycetes. See Illus. II, fig. 30.

Branched (*of the hyphae*). With the hyphae dividing, see Illus. II, fig. 23.

Brittle. Easily broken, descriptive of the pileus when the context dries hard

Buff. Brownish yellow.

Bulbous (*of the stem*). With a swollen or enlarged portion at the base.

Caespitose. Occurring in clumps or clusters, the pilei arising from about the same point.

Capitate. With a head (of cystidia, see Illus. II, fig. 28).

Cartilaginous (*of consistency*). Tough, like cartilage.

(*of appearance*). Translucent, somewhat like oiled paper.

Central (*of the stem*). Attached to the middle or center of the cap or pileus.

Chestnut brown. Dark reddish brown.

Ciliate. Fringed with hairs.

Cinereous. Ash colored; a dirty white.

Cinnabar red. A bright deep red; vermilion.

Clavate (*of cystidia*). Thickened at the apex; club shaped.

Cm. Centimeter.

Collapsed (*of the dissepiments*). Caving in upon one another.

Colliculose (*of the surface*). Covered with small elevations.

Compressed (*of the stem or teeth*). Flattened transversely.

Compressed globose. Nearly spherical, but flattened somewhat.

Compressed ungulate. Hoof shaped, but flattened somewhat.

Conchate. Thin, curved, shaped like a shell, see Illus. I, fig. 7.

Concolorous. Of the same color.

Confluent. Running together; joining or fusing.

Context. The inner substance of the pileus or cap.

Conical. Shaped like a cone; with a circular base and tapering above to a point.

Conidium (plural *conidia*). Asexual or vegetative spores.

Convex. Curving outward; arched.

Coriaceous. Leathery in texture. *Polyporus pargamenus, P. versicolor,* or *Daedalea unicolor* typically illustrate this quality of texture.

Crisped (*of the margin*). With small folds; wrinkled.

Crust. A differentiated layer of tissue over the softer tissue, usually hard to indent or break through.

Cylindrical (*of the spores*). More or less elongated and with the sides parallel, circular in cross section. See Illus. II, fig. 31.

Cystidium (plural *cystidia*). Sterile modified terminal cell of a hypha in the hymenium that is conspicuous (usually larger in diameter than the basidia), usually colorless, and thin walled. See Illus. II, fig. 28.

Daedaloid (*of the pore mouths*). Elongate and sinuous. See Illus. I, fig. 15.

Decurrent (*of the tubes*). Extending down the stem.

Dentate. Toothed, see Illus. I, fig. 16.

Denticulate. Finely dentate.

Depressed (*of the pileus*). Central portion lower than the margin; with the center concave. See Illus. I, fig. 8.

Determinate (*of the margin*). Definite; having a distinct outline.

Dimidiate. Semicircular in outline; half round.

Dissepiment. Wall of the tube. See Illus. II, fig. 29.

Dorsal. Upper portion or side.

Dry (*of the surface*). Not sticky or watery when fresh.

Duplex (*of the context*). Of two parts, the portion next the tubes firm, the other portion soft and spongy.

Echinulate. With minute spines. See Illus. II, fig. 40.

Effused-reflexed (*of the pileus*). Closely applied to the substratum except the margin which is turned out to form the pileus, see Illus. I, fig. 3.

Ellipsoid (*of the spores*). Evenly narrowing to the rounded ends, longer than broad, usually at least twice as long as broad. See Illus. II, fig. 33.

Endospore. The inner layer of the wall of a spore.

Entire (*of the edges of the pores*). Smooth, without any indentations.
Epispore. The outer layer of the wall of a spore.
Equal (*of the stem*). Of the same diameter throughout.
Epixylous. Growing on wood.
Excentric. Not in the center.
Farinaceous. Mealy, with the taste or odor of meal.
Fibrils. Minute fibers.
Fibrillose. Covered with or composed of minute fibers.
Fibrous. Composed of fibers which are rather tough.
Fimbriate. Fringed, see Illus. I, fig. 17.
Firm (*of the context*). Moderately resisting indenting by the fingernail.
Flabelliform. Fan-shaped in outline.
Fleshy tough. When fresh, watery but rather leathery in texture.
Floccose. Downy; woolly.
Fragile (*of the context*). When dry, the needle breaking out small blocks of tissue rather than threads from the firm context.
(*of the pileus*). When dry firm to rather soft but easily broken, the context soft to firm but not hard.
Friable (*of the context*). Easily crumbling, the hyphae of the dry context breaking up into short pieces when picked with a needle.
Glabrous. With neither hairs nor free scales, not necessarily smooth or even but usually so.
Glancing (*of the tubes*). Changing appearance when the angle of incidence of the light is altered.
Glaucous. Covered with a bloom.
Globose. Spherical or almost so.
Guttulate (*of the spore*). With one or more globules within the spore. See Illus. II, fig. 38.
Hard (*of the context*). Strongly resisting indentation by the fingernail.
Hexagonal. Six-sided, the sides and angles more or less regular.
Hirsute. Covered with stiff hairs.
Hispid. Covered with rough hairs or bristles.
Hyaline. Colorless.
Hymenium. The fruiting layer; in the polypores lining the walls of the tubes and composed of basidia with or without sterile structures such as cystidia, setae, paraphyses or hyphal pegs. See Illus. II, fig. 29.
Hypha (plural *hyphae*). The individual threads or vegetative part of the fungus.
Hyphal pegs. Clusters or fascicles of closely agglutinated hyphae projecting into the lumen of the tubes. See Illus. II, fig. 27.
Imbricate. Overlapping on one another, like the shingles on a roof. See Illus. I, fig. 13.
Incised. Deeply cut; as if cut into. See Illus. I, fig. 19.
Incrusted (*of the hyphae or cystidia*). Covered wholly or partly with small crystals.
(*of the surface*). With a thin or thick hard layer or crust over the softer tissue.
Incurved. Bent inward.
Indigo. A deep violet-blue color.
Infundibuliform. Funnel-shaped, see Illus. I, fig. 10.
Innate (*of fibrils*). Appearing as if composed of the substance itself; blending with the substance.
Involute. Rolled tightly inward or down upon itself.
Irpiciform. Teeth-like; broken up into teeth.
Irregular (*of the hyphae*). Diameter changing often, usually abruptly.
(*of the margin*). Not in a continuous smooth line; not even.
KOH solution. A 3 per cent solution of potassium hydroxide.
Labyrinthiform. With intricate sinuous or winding appearance; serpentine. See Illus. II, fig. 15.
Laccate. As though varnished.
Lacerate. Irregularly cut, as though torn.

Lamella (plural *lamellae*). The flat, expanded, knife-blade like plate on the under side of the pileus; a gill.
Lamellate. With lamellae or gills.
Lateral (*of the stem*). Attached on one side.
Laterally confluent. Joining at the margin, as where the margin of one pileus unites with the margin of another pileus.
Lobed (*of the margin*). With rather large rounded divisions and broad sinuses.
Mealy. Floury; like meal.
Mm. Millimeter.
Mouths. Openings of the tubes.
Mycelium. The mass of hyphae which make up the vegetative portion of a fungus.
Obtuse (*of the margin*). Rounded; blunt.
Ochraceous. Yellow tinged with red or brown.
Ovoid. Egg-shaped, thick and rounded at one end, tapering with convex sides to the other end. See Illus. II, fig. 38.
Pallid. With little color; an indefinite pale whitish or pale brownish color.
Paraphysis (plural *paraphyses*). Inconspicuous sterile hyphal structures in the hymenium; the scarcely modified free ends of hyphae which are usually less than the diameter of the basidia. See Illus. II, fig. 24.
Pedicellate. With a stalk; borne on a stalk.
Pellicle. A thin skin-like or cuticle-like covering easily broken, not hard like a crust.
Pelliculose. With a pellicle.
Perennial. Persisting for several years, strictly speaking at least more than two. In polypores the perennial habit is indicated by the layering of the tubes.
Pileolus (plural *pileoli*). A small cap or pileus.
Pileus (plural *pilei*). The fruiting body of the polypores.
Plane (*of the margin*). Evenly horizontal.
(*of the pileus*). Flat.
Polystictus type. Leathery or coriaceous kind of fruiting bodies, tough and flexible when fresh, and usually so when dry.
Poroid. With pores.
Proliferation. An extension of the pileus; an excessive development of part of the pileus.
Pruinose. Covered with a whitish bloom or powder; as if finely powdered.
Pubescent. Covered with short, soft hairs.
Pulverulent. Covered as with a powder.
Punctate. With minute depressions appearing as dots.
Punky. Soft and tough; of the consistency of punk.
Pyriform. Pear-shaped, see Illus. II, fig. 37.
Reflexed portion (*of the pileus*). The portion turned out to form the pileus. See Illus. I, fig. 3.
Reniform. Kidney-shaped. See Illus. II, fig. 35.
Resupinate. Closely attached to the substratum throughout the extent of the fruiting body; with neither pileus nor stem. See Illus. I, fig. 4.
Reticulate. Covered with a network of interlacing lines or veins or ridges.
Rigid (*of the pileus*). Stiff; unbending.
Rimose. Cracked; marked with numerous clefts or cracks.
Rooting (*of the stem*). Extending into the ground for some distance.
Rosette. An imbricate or flower-like cluster.
Rudimentary. Incompletely developed; not clearly differentiated.
Rugose. Wrinkled; with folds or ridges.
Scabrous. Rough with short rigid projections.
Sclerotium. A resting body, composed of a hardened mass of hyphae from which fruiting bodies may develop.
Scrupose. Rough with minute hard points.
Separable (*of the fruiting body*). Capable of being removed from the substratum without difficulty as a sheet; not closely adhering.

Sessile. Without a stalk, the pileus attached at the side. See Illus. I, fig. 2.
Setose. More or less beset with bristles.
Sinuous. Curved, winding.
Sinuate. Same as "sinuous."
Sodden. Saturated with water.
Solitary (of the pileus). Occurring singly.
Spathulate. Oblong, narrowed at one end; spatula-shaped. See Illus. I, fig. 6.
Spore. The reproductive body of a fungus; in the species here described always one celled.
Squamulose. Covered with minute scales or squamules.
Sterigma (plural *sterigmata*). The spine-like projection from the apex of a basidium, bearing at its tip the spore; usually 4 sterigmata to one basidium. See Illus. II, fig. 30.
Sterile below. Said of the under side of the pileus when there is a narrow infertile strip between the margin and the pores. See Illus. I, fig. 11.
Stipitate. Stalked, with a stem or stalk. See Illus. I, fig. 1.
Stratified. Arranged in layers; in perennial species with the several layers of tubes one above another. See Illus. I, fig. 12.
Striate. With radiating or parallel lines or ridges.
Strigose. Covered with rough stiff hairs.
Stuffed (of the pores). Filled with hyphae.
Subapplanate. Somewhat horizontally expanded.
Subcentral. Nearly central.
Subflexuous. Nearly flexuous; somewhat zigzag or winding.
Subfusiform (of the spores). Nearly spindle-shaped; tapering somewhat from the middle to both ends. See Illus. II, fig. 34.
Subiculum. The layer of tissue in resupinate forms corresponding to the context in effused, sessile, or stipitate forms. See Illus. I, fig. 4.
Subpelliculose. With an indistinct cuticle or thin crust.
Subsquamulose. Covered with indistinct scales.
Substance. The inner tissue of the stem or pileus.
Substipitate. Intermediate between stipitate and sessile, usually expressed by a narrowing of the pileus to form an indistinctly differentiated stem.
Substratum. The underlyng substance, usually wood, to which the fruiting body is attached. See Illus. I, fig. 4.
Subulate. Awl-shaped; broad at the base, tapering to a point. See Illus. II, fig. 26.
Subunguliform. Somewhat hoof-shaped.
Sulcate. Grooved or furrowed, here used only when concentrically grooved or furrowed.
Tawny. A dull orange brown color.
Terrestrial. Growing on the ground.
Thick-walled or thin-walled (of the hyphae). See Illus. II, figs. 21 and 22.
Tomentose. Covered with densely matted wool or hair.
Trama. The inner substance of the walls of the tubes; the tissue between adjacent hymenia. See Illus. II, fig. 29.
Tramal. Of or pertaining to the trama.
Truncate. Abruptly cut off; said of spores when one end appears sharply cut off. See Illus. II, fig. 36.
Tuber. As here used same as sclerotium, which see.
Tubercle. A short, rounded projection.
Tuberculate (of the surface). With small rounded projections; nodular.
Tuberculate (of the spores). Appearing knobby or warty. See Illus. II, fig. 39.
Tubes. The hollow cylindrical or irregularly shaped structures of the pileus which bear the hymenia on their inner walls. See Illus. I, fig. 4.
Tufted (of the pileus). Clustered, as if arising from a common point.
(of the surface). With small fascicles or clusters of hyphae.
μ. Micron.
Umbilicate. With a rounded central depression; in the stipitate species usually with a very short stem. See Illus. I, fig. 9.

Umbo. An elevation on the surface of the pileus; a knob-like protruberance.
Umbonate. Having an umbo.
Undulate. Broadly wavy in the vertical direction.
Unequal (of the mouths). Of variable size.
(of the stem). Not of the same or of nearly the same diameter throughout its length.
Ungulate. Hoof-shaped; with the pileus as thick as broad and steep in front. See Illus. I, fig. 12.
Velvety. Like velvet; closely and evenly covered with fine, soft hairs.
Ventricose. Swelling out or inflated at one side (or in the middle). See Illus. II, fig. 26.
Vesicle. An enlarged and apparently empty structure with thin walls.
Vesicular. Of or containing vesicles.
Villous or villose. Covered with soft weak hairs.
Volva. The extension of the tissue of the pileus in *P. volvatus* which covers the pore surface. See Illus. I, fig. 14.
Woody. Hard, like wood.
Zonate. With zones.

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